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Sea shore isopod crustaceans from Bonin Islands

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小笠原諸島産の海産ならびに海浜産等脚目甲殻類

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小笠原諸島は東京の南南東約 1, 000km に位置する海洋島であり，その海産等脚類並びに海浜棲陸産等脚類相は従来まとまった調査が無かった。1995年1月に，国立科学博物館が中心に行った文部省科学研究費「日本周辺の浅海性動物とプレートテクトニクスの関連について」(06304008) により，小笠原諸島父島及び母島において潮間帯，飛沫帯，浅海ドレッジを行った。また，富山市科学文化センター収蔵品を調査した。その結果，海産種17種，海浜棲陸産種8種の計25種が確認されたが，本州等の海岸で見られる種類との共通種は少なく，固有種の可能性が高いものが多かった。また，自由生活をする海産種では概して小型種が多かった。うち，有扇亜目コツブムシ科 *Gnorimosphaeroma* 属の１種が未記載であることが判明し，新種 *Gnorimosphaeroma albicauda*（和名：オジロイソコツブムシ：新称）として記載した。その他，海産では *Dynamenella* 属の１種，*Metacirolana* 属の２種，*Eurydice* 属の１種，*Ianiropsis* 属２種，*Microcharon* 属の１種，さらに魚類寄生生の *Cymothoa* 属の２種，*Mothocya* 属の１種が確認されたが種名決定できなかった。陸産もヒゲナガワラジムシ属 *Olibrinus*，ハマワラジムシ属 *Armadilloniscus*，タマワラジムシ属 *Alloniscus*，ヒイロワラジムシ属 *Littorophiloscia* の諸属に種名決定できなかった各1種ずつがあった。いずれも標本は独立行政法人国立科学博物館もしくは富山市科学文化センターに保管される。

Key words：isopoda, taxonomy, Ogasawara, Bonin Island, sea shore, new species, *Gnorimosphaeroma albicauda*
キーワード：等脚目，ワラジムシ目，分類等，小笠原，海岸，新種，動物相

Bonin Islands are located between Boso Peninsula and Northern Mariana Islands, about 1000 km south of Tokyo, extending more than 400 km from 27° 44. N to 26° 32. N. They extend 100 km from north to south. They are the most representative oceanic islands in Japan. The climates of these islands are subtropical and Bonin islands form a part of single archipelago, located along the Pacific-Philippine Plate and Pacific Eurasian Plate margin. But the basic data on the community and isopod fauna of benthos have been much ignored.

During the survey entitled "Relationships between Shallow water organisms and Plate tectonics" carried out by the scientists of National Science Museum, Tokyo in January, 1995, I could collect many specimens from shores of Chichijima-Island and Haha-jima Islands (Fig.1) including supratidal zone and shore forests. Though dredging of the sea bottom was also carried out, but no isopod was collected.

＊Contributions from the Toyama Science Museum, No.314

At the results of the survey, 25 shore and shallow water inhabiting isopod crustaceans were collected. Specimens studied in this study including a holotype will be deposited at the National Science Museum, Tokyo and other specimens will be deposited at the Toyama Science Museum.

Before going further, I wish to express my sincere gratitude to Dr. Masatsune Takeda and many scientists of the National Science Museum, Tokyo, for their kindness in giving me a chance to examine such interesting specimens, to Dr. Ryohei Yamanishi of the Osaka Museum of Natural History for his kindness in collecting many important specimens. Several parasitic materials on fishes were also available to me by the courtesy of Dr. Hiroyuki Tachikawa of the Ogasawara Oceanic Center and Dr. Kenji Kato of the Tokyo Metropolitan Fisheries Station.

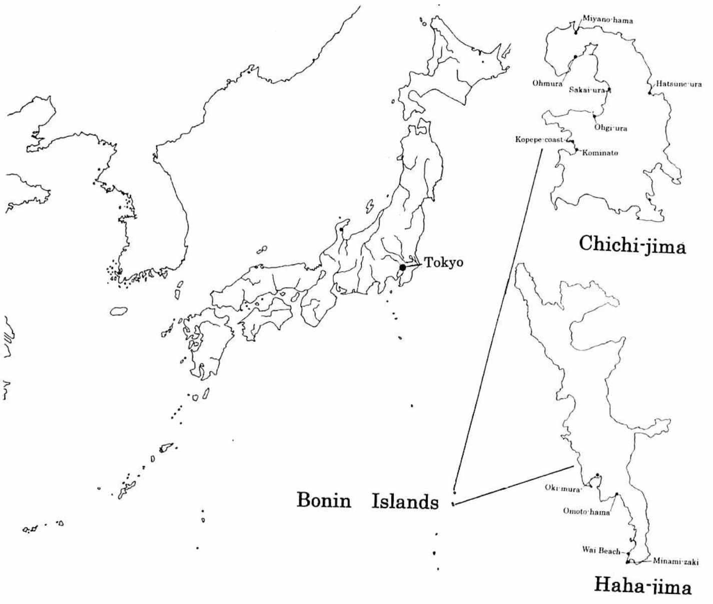

Fig. 1. Map showing the main sampling sites.

Order Isopoda

Suborder Flabellifera

Family Sphaeromatidae

Gnorimosphaeroma albicauda n.sp.

(Fig.2)

Material examined: 5♂♂ (1♂holotype, 2.5 mm in body length and 4♂♂ paratypes, 2.5 ~3.1 mm in body length and 11♀♀ (1♀, allotype, 2.0mm in body length and 10♀♀ paratypes 1.5 ~ 2.5 mm in body length), on the rock of intertidal zone of Hatsune-ura, Chichi-jima, coll. Noboru Nunomura Jan, 11, 1995. ; 2♂♂2♀♀, Miyano-hama, Chichi-jima, Jan. 9, 1995, coll. Noboru Nunomura; 1♀, Kopepe-hama, Chichi-jima, coll. Noboru Nunomura Jan, 13, 1995; 1♂1♀, Sakai-ura, Chichi-jima, Jan. 10, 1995, coll. Noboru Nunomura. Type series is deposited as follows: Holotype (NSMT Cr-16123), allotype (NSMT Cr-16124), and 5 paratypes (NSMT Cr-16125) are at the National Science Museum, Tokyo and 5paratypes (TOYA Cr-13112 ~ 13116) at the Toyama Science Museum.

Description: Male. Body (Fig. 2A) 1.9 times longer than wide. Color of dorsal surface brown, but pleotelson is white. Cephalon with a small but protruded rostrum at the medial part of anterior margin. Eyes big, each with 38-42 ommatidia Anterior suture line of pleon shorter than the posterior one. Posterior margin of pleotelson slightly rounded. Antennule (Fig. 2D) with 3 peduncular segments and 7-8 flagellar segments, each segment with 1-2 stout aesthetascs. Antenna (Fig. 2E) a little longer than antennule, peduncular segments slenderer, flagellum composed of 10 segments.

Right mandible (Fig. 2F) : pars incisiva 3-toothed; lacinia mobilis not chitinized, with 7-8 teeth; 3 spines row of stout serrate spines; processus molaris broad and truncate, with marginal teeth; palpal segments 2 bearing 6 fringed setae, segment 3 bearing 4-7 fringed setae. Left mandible (Fig. 2G) : pars incisiva 3-toothed; lacinia mobilis single-toothed; 4 spines row; processus molaris broad and truncate, with marginal teeth; palpal segment 2 bearing 6 fringed setae, segment 3 bearing 4-7 fringed setae. Maxillula (Fig. 2H) : inner lobe bearing 4 stout fringed apical setae; outer lobe bearing 10 teeth at the tip. Maxilla (Fig. 2I) : each ramus of outer lobe with 4 setae distally; inner lobe also with 5 setae. Maxilliped (Fig. 2J) slender: endite slender, with a coupling hook on lateral mar-gin and 9-10 setae on distal margin; palp of 5-segmented; first segment small; second segments big, with 8-9 setae; third segment with 8-9 setae on inner margin; fourth segment with 4 setae on inner margin and a seta on outer margin; fifth segment with 5 setae on apical margin.

Pereopod 1 (Fig. 2K): basis rectangular, with a relatively long seta at inner distal angle; ischium rectangular and

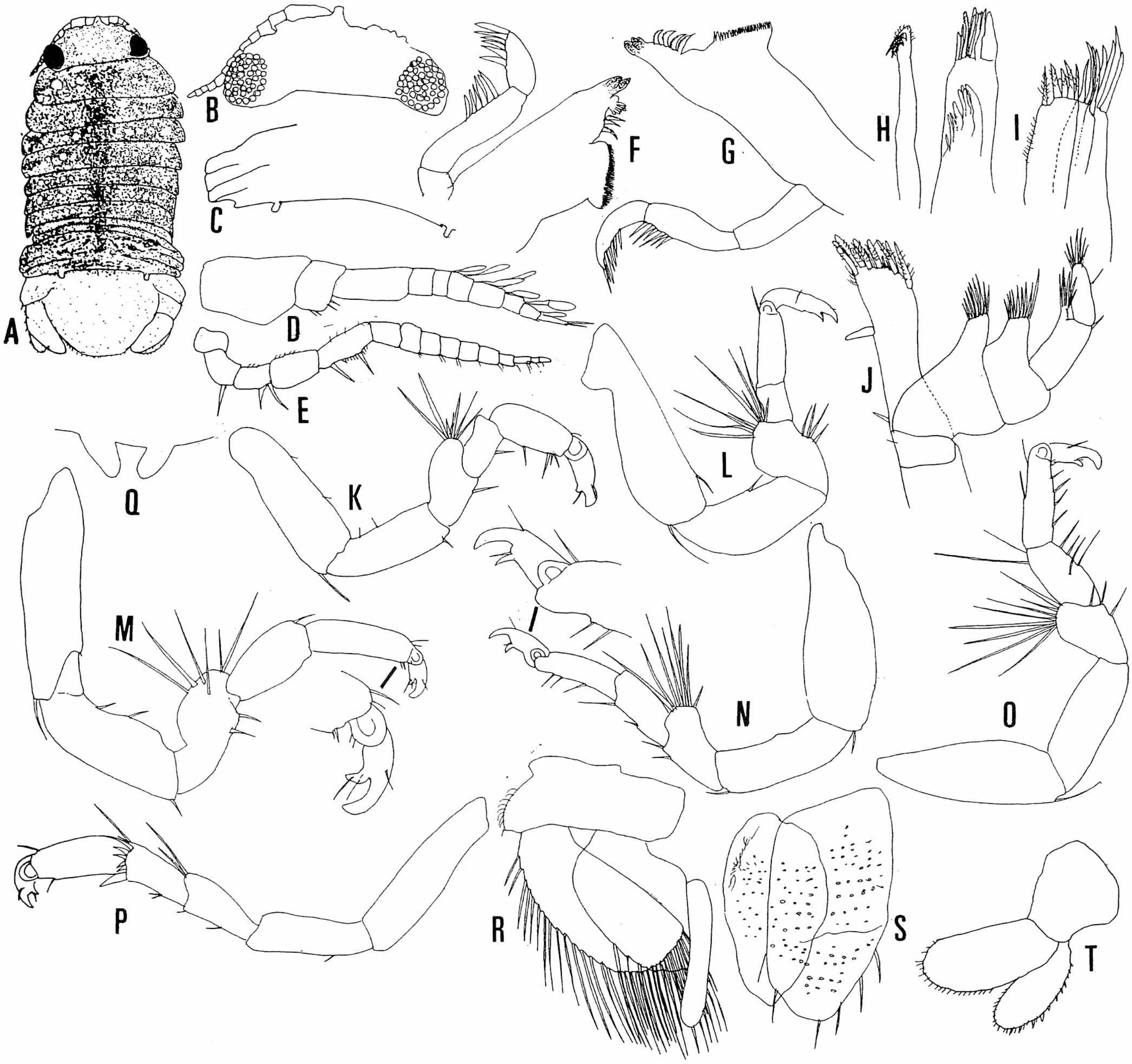

Fig.2 *Gnorimosphaeroma albicauda* n.sp.
A: Dorsal view; B: Cephalon; C: Suture lines of pleonal somites; D: Antennule; E: Antenna; F: Right mandible; G: Left mandible; H: Maxillua; I: Maxilla; J: Maxilliped; K: Pereopod 1; L: Pereopod 2; M: Pereopod 3; N: Pereopod 4; O: Pereopod 5; P: Pereopod 7; Q: Penes; R: Pleopod 2; S: Pleopod 4; T: Uropod (All : Holotype male form Hatsune-ura).

as long as basis, with a seta on inner margin and 2 setae on distal margin; merus trapezoidal, half as long as ischium and trapezoidal, with a seta at the distal end on inner margin and 7-8 setae at the outer distal corner; carpus rectangular, with a seta on inner margin; propodus almost as long as merus, with 4-5 setae on inner margin, fine setae on basal half of outer margin and a long setae at the distal part; dactylus stout, with a stout seta.

Pereopods 2-6 (Fig.2 L-O) similar in shape : basis oblong, 3 times as long as wide, with a long seta at inner distal corner; ischium a little shorter than basis ; merus with 6-8 relatively long setae on distal outer corner; carpus a little shorter than merus; propodus 1.3-1.5 times longer than carpus, bearing 2-3 setae on inner margin; dactylus bifid.

Pereopod 7 (Fig.2P): basis oblong 3.6 times as long as wide; ischium a little shorter than basis; merus 2/3 as long as ischium, with 2 long setae at outer distal corner; carpus as long as merus, with 7-8 stout setae on distal margin; propodus as long as carpus, bearing 2-3 setae on inner margin; dactylus stout. Penes (Fig.2Q) rather stout.

Male second pleopod (Fig.2R): basis rectangular; endopod semicircular, with 15-16 setae; stylus club-shaped; exopod rectangular, with 30-32 setae around the margin.

Pleopods 4 (Fig.2S): both rami lanceolate.

Uropod (Fig.2T): basis pentagenal endopod; distally flattened; exopod lanceolate and 3/4 as long as endopod.

Female: Almost the same as male except copulatory apparatus.

Etymology: *albus* = white in Latin, *cauda* = tail in Latin.

Remarks: The present new species is most closely allies to *Gnorimosphaeroma rayi* Hoestlandt, 1969, but the former is separated from the latter in the following features: (1) white pleotelson, (2) less numerous setae on inner lobe of maxillula, (3) less numerous setae on maxilla, (4) less numerous setae of both antennae, (5) less numerous setae on mandibular palp, (6) shorter anterior suture line of the posterior part of pereonal somite, (7) bigger eyes and (8) longer setae on outer part of merus of pereopods.

***Dynamenella* sp. (aff. *laticauda* Nunomura, 1999)**

(Fig.3)

Dynamenella laticauda Nunomura, 1999. pp.21-24, Fig.7.

Material examined: 2♂♂2♀♀, Miyano-hama, Chichi-jima, Jan. 13, 1995, coll. Noboru Nunomura.

Description: Male-Body (Fig.3A) ovate. Body1.4 times as long as wide. Color yellow in alcohol. Cephalon moderate in size, with a flattened rostra on anterior margin. Eye small, each eye composed of 5-6 ommatidia. Pereonal somite subequal in length. Epimera indistinctly separated from pereonal somites. First pleonal somite partially concealed beneath seventh pereonal somite.

Antennula (Fig.3B) with 3 pedunclar segments and 6 flagellar segments. Antenna (Fig.3C): reaching the posterior end of pereopod; flagellum with 5 peduncular segments and 11 flagellar segments.

Lower lip rounded. Right mandible: pars incisiva 2-toothed; lacinia mobilis 3-toothed; 5-6 serrated setae. Left mandible: pars incisiva 3-toothed; lacinia mobilis bi-dentate. Maxillula (Fig.3 D) : inner lobe with 4 long plumose setae at the tip. Maxilla: inner lobe with 3 pectinated aesthetascs and 3-4 plumose setae at the tip; both rami of outer lobe with 4 relatively long pectinated spines at the tip. Maxilliped: endite extending the middle part of fourth palpal segment; palp 5-segmented, first segment small without seta, second segment big and rectangular with 3 setae on distal inner area; third segment almost square and slightly smaller than the second, with a protruded inner distal corner bearing 6-7 stout setae; fourth segment rectangular, with 4-5 setae on inner margin; terminal segment slightly shorter than the fourth, with 5-7 setae around the margin.

Pereopod 1 (Fig.3E) :basis rectangular, 2.9 times as long as wide ; ischium 3/4 as long as basis ;merus half the length of ischium, with 4-5 setae on inner margin and a seta at outer distal angle; carpus short and triangular, with 4-6 setae on inner margin; propodus rounded, 1.2 times longer than merus, with 6-7setae on inner margin; dactylus bifid.

Pereopods 2-6 (Fig.3F) :basis oblong 4 times as long as wide; ischium as long as basis basis; merus half the length of ischium; carpus a little longer than merus; propodus as long as basis, with 8-9 setae on inner margin: dactylus bifid.

Pereopod 7 (Fig.3G) :basis oblong and 5 times as long as wide; ischium a little longer than basis; merus half the length of ischium, with 3 setae on inner margin.; carpus a little shorter than merus, with 2 setae on inner margin; propodus 1.8 times longer than carpus, with 3 setae on inner margin; dactylus.

Penes (Fig.3I) paired and long, tapering toward the tip bifid.

Pleopod 2 (Fig.3J) in male: basis rectangular with 5 coupling hooks; endopod triangular; stylus tapers toward the tip; exopod semicircular.

Pleopod 3: endopod triangular; exopod round.

Pleopods 4-5 (Fig.3L) : both rami laminate and thickened.

Uropod (Fig.3M) large: endopod lanceolate, with sinuate margin; exopod rectangular with a sinuate margin.

Female: Almost the same as male except of copulatory apparatus and smaller urpods.

Remarks: The present species is allied to *Dynamenella laticauda* Nunomura recorded from Hachijo Island. But the former is separated from the latter in the following features: (1) shape of pleotelson, especially not protruded strongly outwards, (2) whitish body color, (3) less tuberculate body surface and (4) round hole of posterior area of pleotelson.

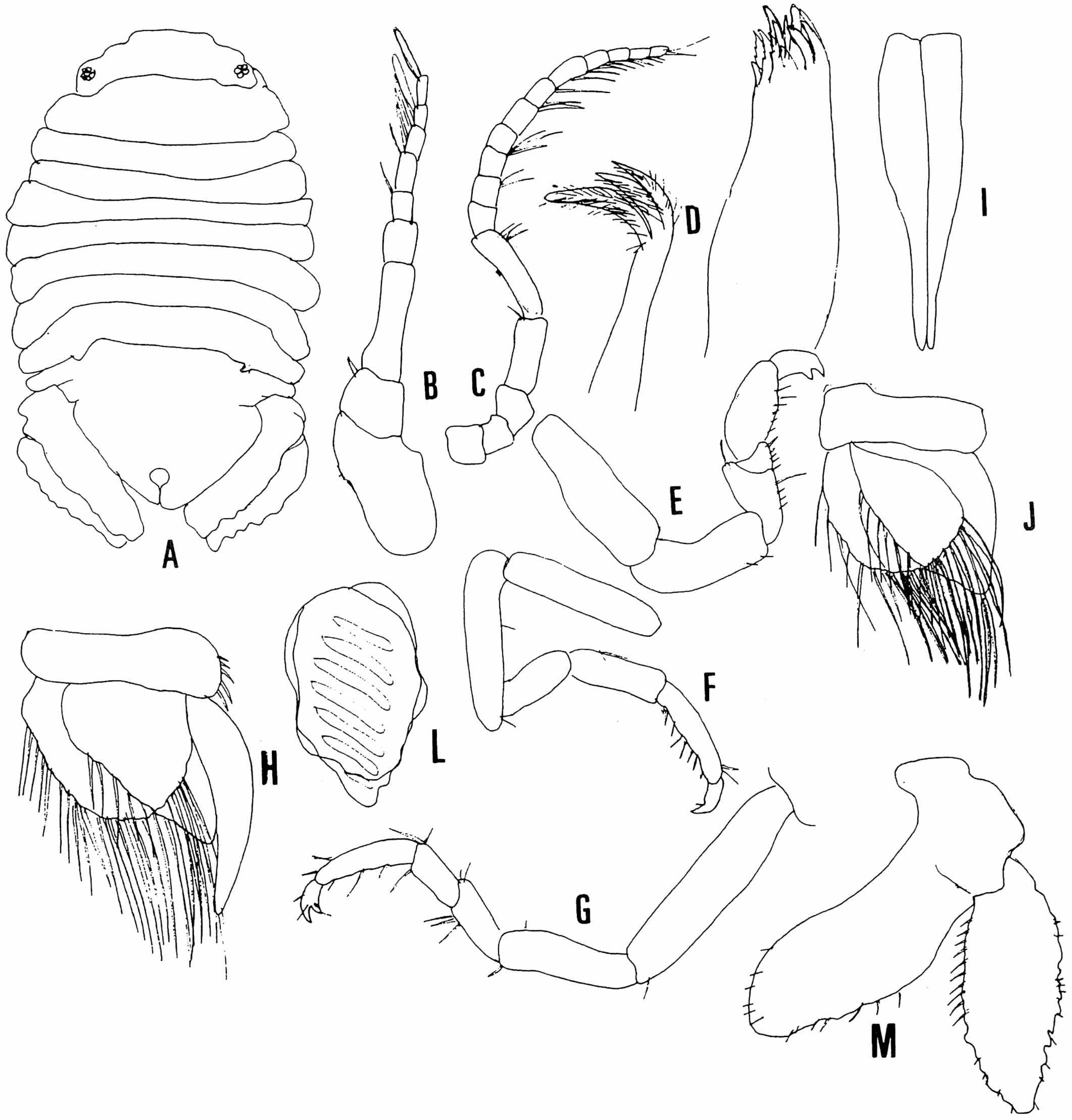

Fig.3 *Dynamenella* sp. (aff. *laticauda* Nunomra, 1999.)
A: Dorsal view; B: Antennule; C: Antenna; D: Maxillula; E: Pereopod 1; F: Pereopod 2; G: Pereopod 7; H: Pleopod 2; I: Penes; J: Pleopod 3; L: Pleopod 4; M: Uropod (All: Male from Miyano-hama, Chichi-jima).

Family Cirolanidae

Cirolana harfordi Lockigton *japonica* Thielemann. 1910

(Jap. name: Nise-sunahori-mushi)

Cirolana harfordi Lockigton *japonica* Thielemann. 1910: 1-14. f igs, 5-7.

Cirolana harfordi Lockigton *japonica* Shiino. 1965:54 : 1-716.

Material examined; 1♂2♀♀, Mioyano-hama, Chichi-jima, intertidal zone, Jan. 12, 1995, coll. Noboru Nunomura.

Eurydice sp. (aff. *nipponica* Bruce & Jones, 1981)

(Fig.4)

Material examined; 1♀ (3.6mm in body length), interstitial environment of sandy beach of Futami Bay, Chichi-jima, Jan.10, 1995, coll Ryohei Yamanishi.

Description: Body (Fig.4A) 2.6 times as long as wide. Color dull yellow in alcohol. Cephalon elliptical, with a small medial anterior projection. Frontal lamina narrow. Eyes big, each eye composed of more than 50 ommatidia. Pereonal somite widest at 2-3 pereonites. Pleotelson slightly rounded; posterior part of pleotelson with a shallow concavity and a pair of stout spines.

Antennula (Fig.4C) 4-segmented; terminal segment with 4-5 aesthetascs. Antenna (Fig.4B) reaching the posterior end of seventh pereonal somite; flagellum with 12 segments.

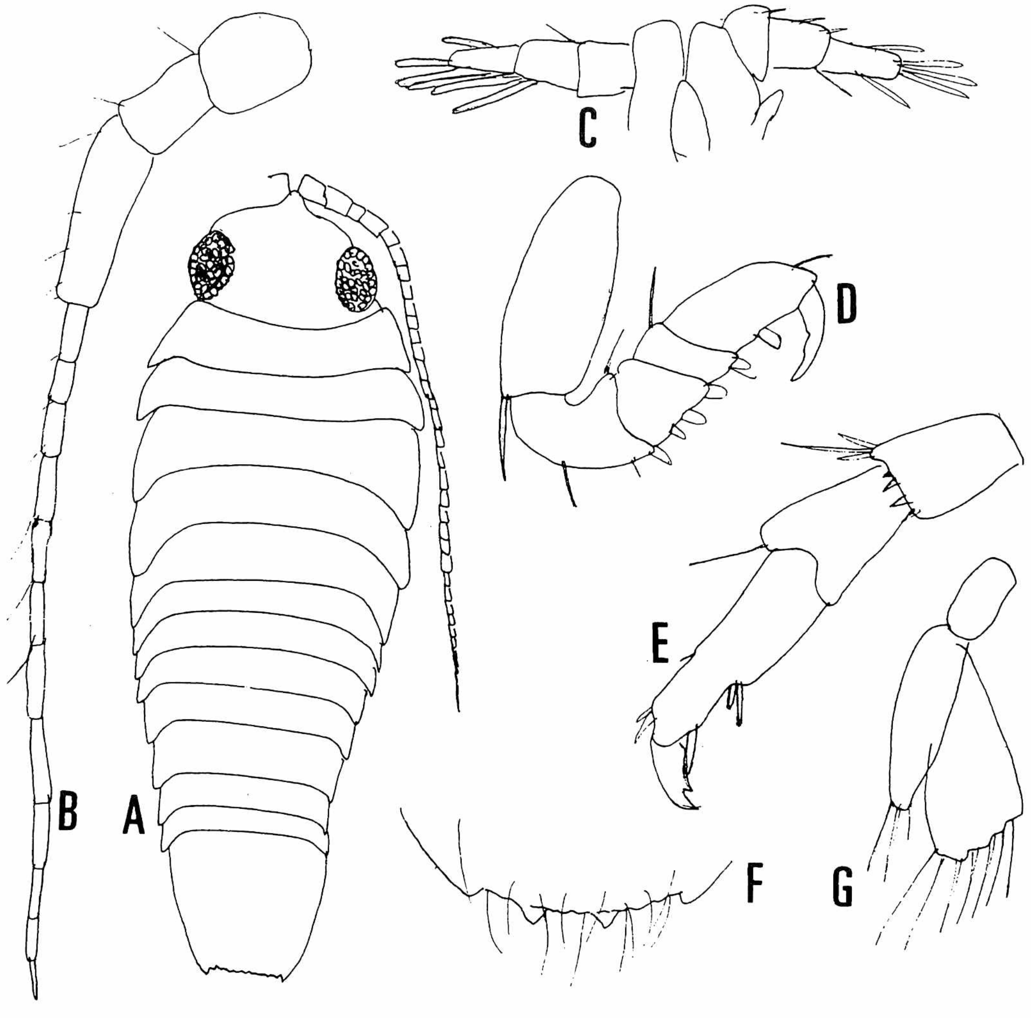

Fig.4 *Eurydice* sp. (aff.nioppnesis, Bruce and Jones, 1981)
A. Dorsal view, B: Antenna; C: Ventral view of anterior part of cephalon; D: Pereopod 1; E: pereopod 7; F: Posterior part of pleotelson; G: Uropod (All: Female from Futami Bay, Chichi-jima).

Pereopod 1 (Fig.4D) : basis elliptical, with a long seta at inner distal corner; ischium with a seta at the middle area of inner margin and a seta at the outer distal corner; merus with 4 stout spines on inner margin; carpus relatively short, with a seta; propodus stout, with a stout spine on the inner margin.

Pereopod 3: basis long; ischium triangular, with a stout spine on inner distal corner; merus with 2 spines on inner margin and a long seta on outer margin; carpus small and triangular with 4-5 setae on inner margin and a seta on distal margin; propodus stout.

Pereopod 7 (Fig.4E) :basis stout ;ischium rectangular; merus almost square, with 5-6 setae on distal margin; carpus almost square, with a long seta at distal outer corner; propodus rectangular, with 2 setae on the middle area on inner margin and a seta at inner distal corner and a small seta and 2 setae at outer distal corner.

Uropod (Fig.4G) : basis rectangular; endopod lanceolate, with 3 setae; exopod elongated triangular, with 6 setae.

Remarks: The present species is allied to *E. nipponica* Bruce and Jones, reported from Kagoshima, but it is separated from *nipponica* in the following features: (1) less numerous segments of antenna, (2) bigger eyes and (3) shape of body and posterior end of pleotelson. Though this specimen is not only partly broken, it is considered to be young one.

Metacirolana **sp.1**

(Fig.5)

Material examined： 1♀ (2.0mm in body length), beach of Sakai-ura, Chichi-jima, Jan.10, 1995, coll. Noboru Nunomura.

Description of female: Body (Fig.5A) almost rectangular, 2.0 times as long as wide. Color creamy white. Cephalon pentagonal: anterior margin protruded but posterior margin rounded. Eyes laterally situated, mediocre in size. Pleotelson triangular but its posterior part rounded. Frontal lamina narrow. First pereonal somite a little longer than the succeeding ones. Seventh pereonite about twice as long as the others.

Antennula (Fig.5 B) 6-segmented. Antenna (Fig.5C), reaching the posterior end of the first pereonal somite, composed of 3 peduncular and 9-10 flagellar segments.

Mandible (Fig.5D) : pars incisiva composed of 4 strong teeth; lacinia mobilis small; processus molaris wide; palp 3-segmented, first segment relatively short, second segment long, with 7 pectinated teeth; terminal segment with 6 setae. Maxillula (Fig.5E) : outer lobe with 6 teeth; inner lobe with 3 segments. Maxilla: both rami of outer lobe with 3 setae. Maxilliped (Fig.5F) : endite small; palp 5-segmented; second segment wide and almost square, with 5-6 setae on inner margin and a seta on outer margin.

Pereopod 1 (Fig.5G) : basis elliptical; ischium a little shorter than basis, with 2 setae on inner margin and a seta on outer distal area; merus almost square, with 4 setae on inner margin and a seta at outer distal angle; carpus short and triangular, with a seta on inner margin; propodus relatively stout, with 8-10 short setae on inner margin.

Pereopod 3: basis elliptical; ischium as long as basis; merus relatively short, with 3 protuberances on inner margin; carpus short; propodus relatively slender, with a stout seta on inner distal area.

Pereopod 5: basis elliptical, with a seta at the inner distal corner; ischium with 3 setae on inner margin and 2 setae at outer distal corner; merus relatively short, with 3 setae on inner margin and 2 setae at outer distal corner; carpus with 10-11 setae on distal margin; propodus rectangular, with 4 setae on inner margin and 2 setae at inner distal corner.

Pereopod 6 (Fig.5H) a little longer than the fifth: basis elliptical; ischium with 2 setae at inner distal corner and 3 setae at outer distal corner; merus with 2 setae on inner margin and 3 setae at outer distal corner; carpus with 9 setae on distal margin; propodus rectangular, with a seta at inner distal corer and 2-3 setae at outer lateral corner.

Pereopod 7 (Fig.5I) only a little longer than the sixth: basis elliptical; ischium with 3 setae at outer distal corner and 4-5 setae at outer distal corner; merus with 2 setae at inner distal corner and 3 setae at outer distal corner; carpus with 9-10 setae on distal margin; propodus rectangular, with 2 setae on the middle part of inner margin and a seta at inner distal corer, and 2-3 setae at outer distal corner.

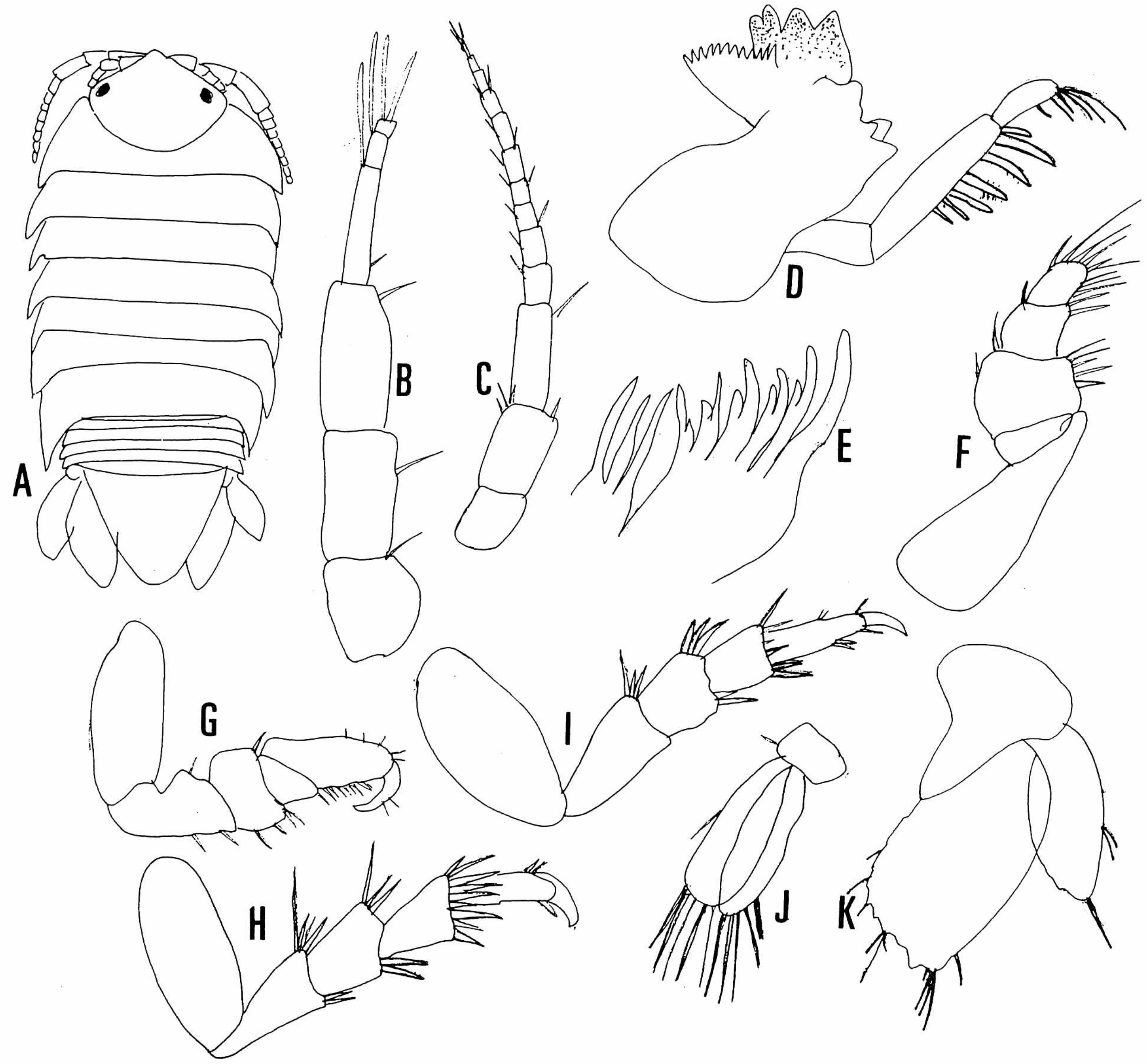

Fig.5 *Metacirolana* sp. 1
A: Dorsal view; B: Antennule; c: Antenna; D: Mandible; E: Maxillula; F: Maxilliped; G: Pereopod 1; H: Pereopod 6; I: pereopod 7; J Pleopod 2; K: Uropod, (All: Female from Sakai-ura, Chichi-jima).

Pleopods 1-5 (Fig.5J): basis rectangular; both rami lanceolate, with 5 setae on inner margin.

Uropod (Fig.5K): basis triangular; endopod lanceolate, smaller than exopod; exopod rectangular, with sinuate margin.

Remarks: Hitherto, 30 species of the genus *Metacirolana* have been known from all over the world, and two species from Japan and its neighboring seas. The present specimen is considered to be allied to the *M. costana* recorded from the coast of Miyake Islands, the former is separated from the latter in the following features: (1) absence of medial ridge on pleotelson, (2) smaller eyes, (3) numerous setae and (4) lack of longer setae around the margin of uropod. Only a few specimens were available for my study, therefore I refrained to establish a new species.

***Metacirolana* sp.2**
(Fig.6)

Material examined: 1♀ (3.7mm in body length), Minami-zaki, Haha-jima, Jan. 8, 1995, coll. Noboru Nunomura.

Description of female: Body rectangular, 2.1 times as long as wide. Cephalon rectangular, with a small protruded tip at the tip. Pereonites 1 and 7 longer than the other segments. Pleonal somites short. Pleotelson semicircular and

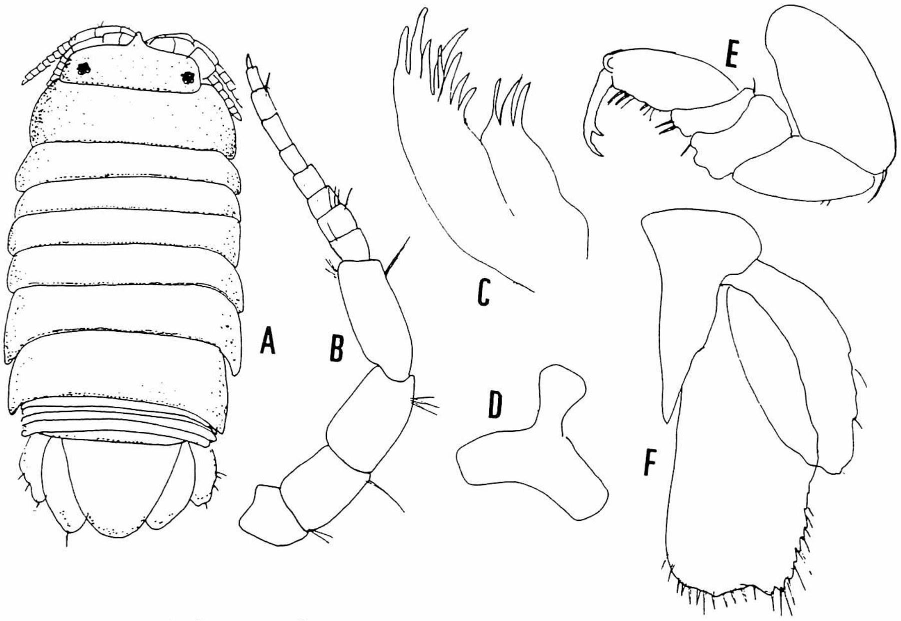

Fig.6 *Metacirolana* sp .2
A: Dorsal view B: Antenna; C: Maxillula; D: Clypeus and frontal lamina; E: Pereopod 1; F: Uropod (All: Female from Minami Hama, Haha-jima).

rounded.

Antennule with 9 segments. Antenna (Fig.6B) a little longer than antennule, with 9 flegellar segments.

Maxillula: endopod with 3 plumose setae on the tip of inner lobe and 8 setae on the tip of outer lobe. Maxilliped: third palpal segments big and square, with 5 setae on inner margin and 2 long setae outer margin; fourth palpal segment square, with 3 setae on inner margin and a long seta on outer distal area; fifth palpal segment with 4 relatively long setae at the tip.

Pereopod 1 (Fig.6E) : basis elliptical, with a seta at the inner distal corner; ischium a little shorter than basis; merus relatively short; carpus very short; propodus swollen, with 7-8 setae on inner margin; dectylus relatively slender.

Pereopod 7: basis rectangular ; ischium elongated, with 5-6 setae on outer distal area; merus square, with 6-7 setae on inner distal area, 4-5 setae on inner medial area and 5-6 setae on outer distal area; carpus a little longer than merus, with 8 setae on inner distal area, a seta on inner medial area and 5-6 setae on outer distal area; propodus slender but longer than carpus, with 2 setae on inner distal area, 2 setae on inner medial area and 2 setae on outer distal area.

Uropod (Fig.6F) :basis triangular ; endopod rectangular, with sinuate margin, bearing about 22 short setae around margin ; exopod lanceolate.

Remarks: The present specimen is considered to belong to the genus *Metacirolana*, and be allied to the *M. costana* recorded from the coast of Miyake Islands, but the former is separated from the latter in the following features: (1) absence of medial ridge on pleotelson, (2) absence of tubercle, smaller eyes and (3) absence of tubercles on inner margin of pereopods 1 and 2.

Family Cymothoidae

Glossobius auritus Bovalius, 1885

Glossobius auritus Bovalius, 1885.

Glossobius ogasawarensis Nunomura, 1992

Material examined: 1♂and 2♀♀ from the mouth of exocdoetid, fish, *and Cypseulus angustceps* taken from the sea near Kitaioujima, Kenji Kato, June 18, 1991.

Nunomura described *Glossobius ogasawarensis* Nunomura, 1992 from exotcoetid fish *Cypselurus angustceps* caught in Bonin Island, but this species is considered to be a junior synonym of *Glossobius auritus* Bovalius 1885.

Cymothoa sp.1

(Figs.7)

Material examined: 1♀ (44.6 mm in body length) and 2♂♂ (23.7-39.3 mm in body length) from the mouth of porcupine fish, *Diodon hystrix*, off Byobudani, Chichi-jima, Dec.15, 1993, coll. Fumihiko Sato.

Description. Male-Body (Fig.7B) scarcely twisted, 2.5 times as long as wide, at widest pereonite 5. Color dull yellow in alcohol. Cephalon semicircular. Eyes lacking. Pereonal somite. Pleotelson rounded and rectangular. Antennula (Fig.7C) 8-segmented. Antenna (Fig.7D) 8-segmented. 3 setae at apex. Mandible (Fig.7E) with 3 teeth at the tip; palp 3-segmented of which terminal segment small. Maxillula (Fig.7F) with 4 teeth at the tip. Maxilla rectangular; its apex with 8 claws. Maxilliped (fig.7G) 3-segnted; terminal segment big and rectangular; second segment square; terminal segment narrow with 2 claws.

Pereopod1 (Fig.7H) :basis rectangular, 2.1 times as long as wide; ischium 0.4 times as long as basis; merus relatively short, 0.4 times as long as wide; carpus triangular; propodus almost as long as ischium; dactylus long and recurved.

Pereopods 2-7 (Fig.7I and J) : basis robust and almost square; ischium almost half the length of basis, merus short; carpus almost triangular; propodus; dactylus recurved.

Penes short and rounded.

Pleopod 2 (Fig.7K): basis rectangular; endopod rectangular, times as long as wide; stylus straight, tapering towards the tip, 1.3 times exceeds than the endopod. Other pleopods (Fig. 7L) similar in shape.

Uropod (Fig.7M) : basis triangular and spreading toward the terminal area.

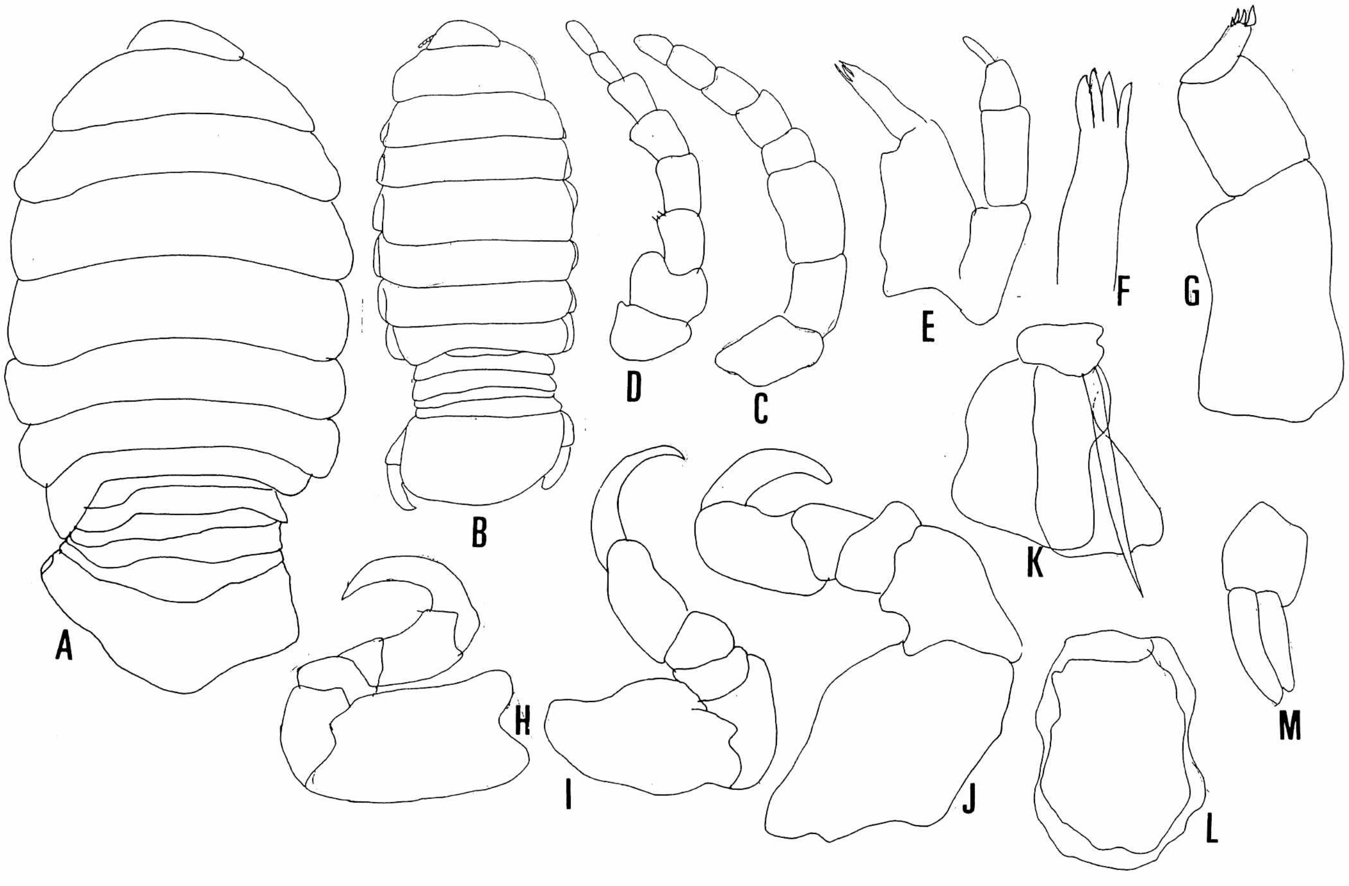

Fig.7 *Cymothoa* sp. 1.
A: Dorsal view of female; B: Dorsal view of male; C: Antennule; D: Antenna; E: Mandible; F: Maxillula; G: Maxilliped; H: Pereopod 1; I: Pereopod 2; J: Pereopod 6; K: Pleopod 2; L: Pleopod 4; M: Uropod (A: Female, B-M: Male from *Diodon hystrix*, off Byobudani, Chichi-jima).

Female: Body (Fig.7A) scarcely twisted, widest at pereonites 5. Rostrum not produced. Eyes lacking. Other features except copulatory apparatus are as in male.

Remarks: The present species is allied to *C. caraibica* from Haiti, but the former is separated from the latter in the following features: (1) shorter cephalon, (2) longer stylus of male second pleopod, (3) narrower endopod of the same, (4) longer uropod and (5) shorter pleotelson. The present species is separated from the Japanese species, *Cymothoa eremite* Bruennich in the following features: (1) longer cephalon, (2) less protruded of anterolateral margin of pereonite 1, (3) weaker posterior lateral projection of peronote 7, (4) longer uropod and (5) shorter pleotelson.

Cymothoa sp.2

(Fig.8)

Material examined: 1♀ (26.3mm in body length) from a mouth of basslets fish, *Ariola louti* (Forsskal), May 1, 1994. coll. Akiko Suzuki.

Description of female: Body (Fig.8A) 1.9 times as long as wide. Color yellowish white in alcohol. Pleotelson rectangular and round 0.7 times as long as wide.

Antennule (Fig.8B) 6-segmented. Antenna (Fig.8C) a little longer than antennule, 6-segmented.

Mandible (Fig.8D) : palp 3-segmented, terminal segment slender. Maxillula (Fig.8E) tapering toward the tip, with 3 teeth at apex. Maxilla (Fig.8F) wide, with 8 teeth on apical margin. Maxilliped 3-segmented; first palpal segment stout and square; second segment much slenderer than the first; terminal segment with 6 teeth.

Pereopod 1 (Fig.8H) : basis big and rectangular; ischium rectangular and smaller than basis; merus shorter than 2/5 as long as iscgium; carpus short; propodus a little swollen; dactylus long.

Pereopod 7 (Fig.8I) almost similar pereopod 1, but basis and carpus longer, whereas propodus shorter: basis stout, almost square; ischium rectangular; merus and carpus relatively short; propodus 2/3 as long as basis.

Pleopods (Fig.8J-K) : both rami round with sinuate margin in female.

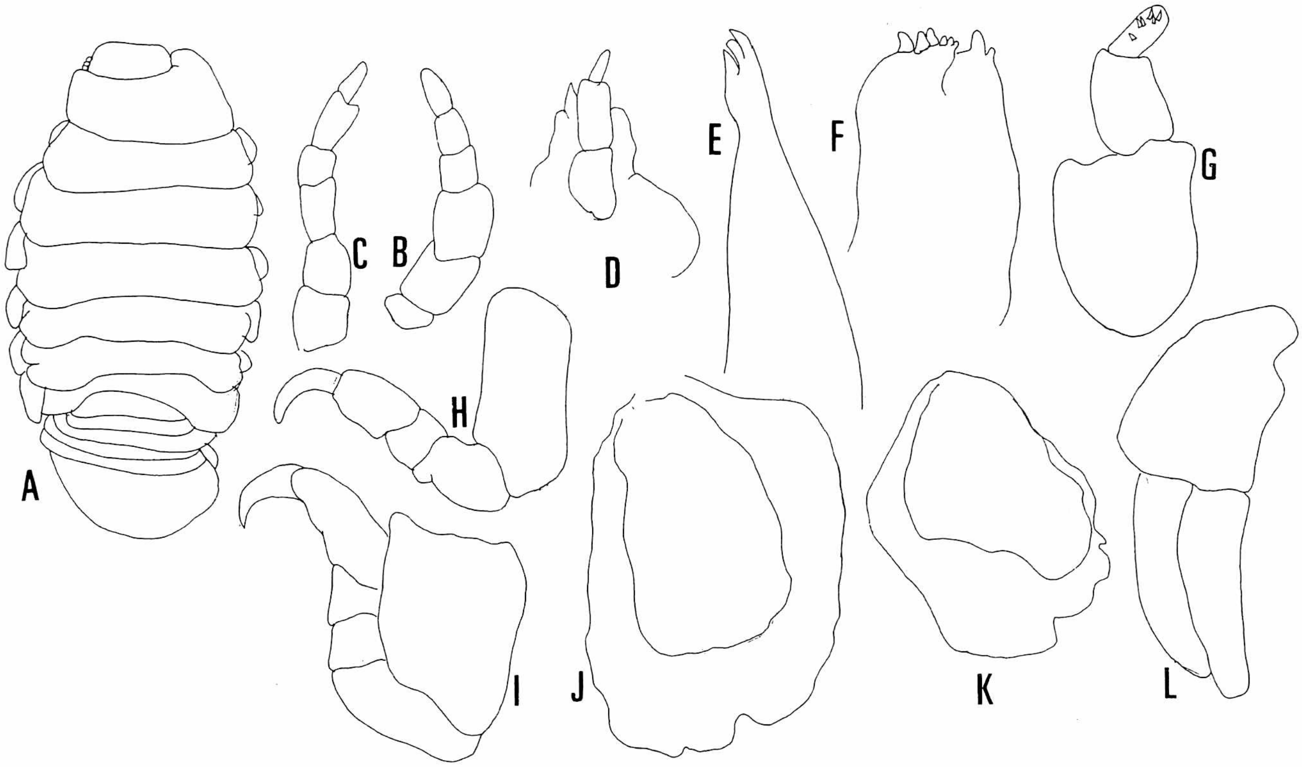

Fig.8. *Cymothoa* sp.2.
A: Dorsal view; B: Antennule; C: Antenna; D: Mandible; E: Maxillula; F: Maxilla; G: Maxilliped; H: Pereopod; I: Pereopod 7 J: Pleopod 1; K: Pleopod 2; L: Uropod (All: Female from *Ariola louti*).

Uropod (Fig.8L): basis rectangular; endopod elliptical; exopod elliptical and a little longer than endopod.

Remarks: The present species is allied to *Cymothoa* sp.1 reported in this paper, but the former is separated from the latter in the following features: (1) longer Cephalon, (2) less numerous segments of both antennae, (3) shorter dactylus of pereopods, (4) larger basis of pereopods, (5) more teeth on the tip of maxilliped, (6) rectangular carpus of pereopods and (7) numerous teeth of maxilla.

The present species is allied to also *C. caraibica* from Haiti, but the former is separated from the latter in the following features : (1) shorter cephalon, (2) wider basis of pereopods, (3) longer merus, carpus and propodus of and (4) shorter pleotelson.

Unfortunately, no male specimens were available for the present study.

Mothocya katoi **Nunomura, 1992**

Mothocya katoi Nunomura, 1992: pp.38-40, fig.3-4.

Material examined: Specimens all from exocoetid fish, *Parexocoetus brachypterus brachypterus* taken around Bonin Island, 2♂♂3♀♀, Nov.12, 1990, coll. Kenji Kato (ovig. Holotype).

Mothocya melanostricta **(Schioedte et Meinert, 1844)**

Irona melanostricta Schioedte et Meinert, 1844

Mothocya melanostricta Schioedte et Meinert, 1844; Bruce 1986.

Material examined: 3♂♂and3♀♀, from the mouth of exocoetid fish, *Parexocoetus brachypterus brachypterus* taken from these off Bonin Islands.

Mothocya **sp.**

(Fig.9)

Material examined: 2♂♂ (13.1-16.5mm in body length) and 1♀ (35.8 mm in body length), from the mouth of corn fish, *Fistularia commersonii* Rüppell collected off Byobu-dani, Chichi-jima, coll. Hiroyuki Tachikawa, May, 3, 1992.

Description of male. Body (Fig.9A) 2.3 times as long as wide, only weakly twisted to one side; convex margin. Color dull yellow. Cephalon rectangular. Pereonal somite 1-2 rectangular. Pereonal somites 3-7 with a pair of antero-lateral projections well developed. The bases of both antennae separated. Pleotelson rectangular.

Antennula (Fig.9B) 7-segmented. Antenna (Fig.9C) 7-segmented.

Mandible (Fig.9D) with bifid apes and 3-segmented palp. Maxillula (Fig.9E) slender, with 4 teeth at tip. Maxilla wide with 10 spines. Maxilliped (Fig.9H): basal segment big and rectangular; second segment square; terminal segment small.

Pereopod 1 (Fig. 9 I): basis big and rectangular; ischium rectangular; merus very short; carpus trianguler and relatively short; propodus relatively short; dactylus long.

Pereopod 2 (Fig.9J) similar to pereopod 1, but longer basis and shorter propodus than the latter.

Pereopod 7 (Fig.9 K) to similar to pereopod 2, but its basis shorter than that of pereopod 2.

Penes as in Fig. 9L.

Pleopod 1 (Fig.9 M) similar in female: basis small; endopod elliptical, with sinuate margin; exopod similar to endopod but a little shorter than endopod.

Pleopod 2 in male (Fig.9N): endopod trapezoidal; stylus acute and almost as long as endopod.

Pleopods 3-5 (Fig. 9 O and P) : both rami wide and rectangular, with sinuate margin.

Uropod (Fig.9Q) : basis rectangular; endopod elliptical; exopod elliptical and longer than the endopod.

Female: Body bigger than male. Other features except copulatory apparatus as in male.

Remarks: The species is most closely allied to *M. parvostis*, but the former is separated from the latter in the following features : (1) smaller eyes, (2) rectangular pleotelson, (3) longer stylus on male second pleopod, (4) more teeth

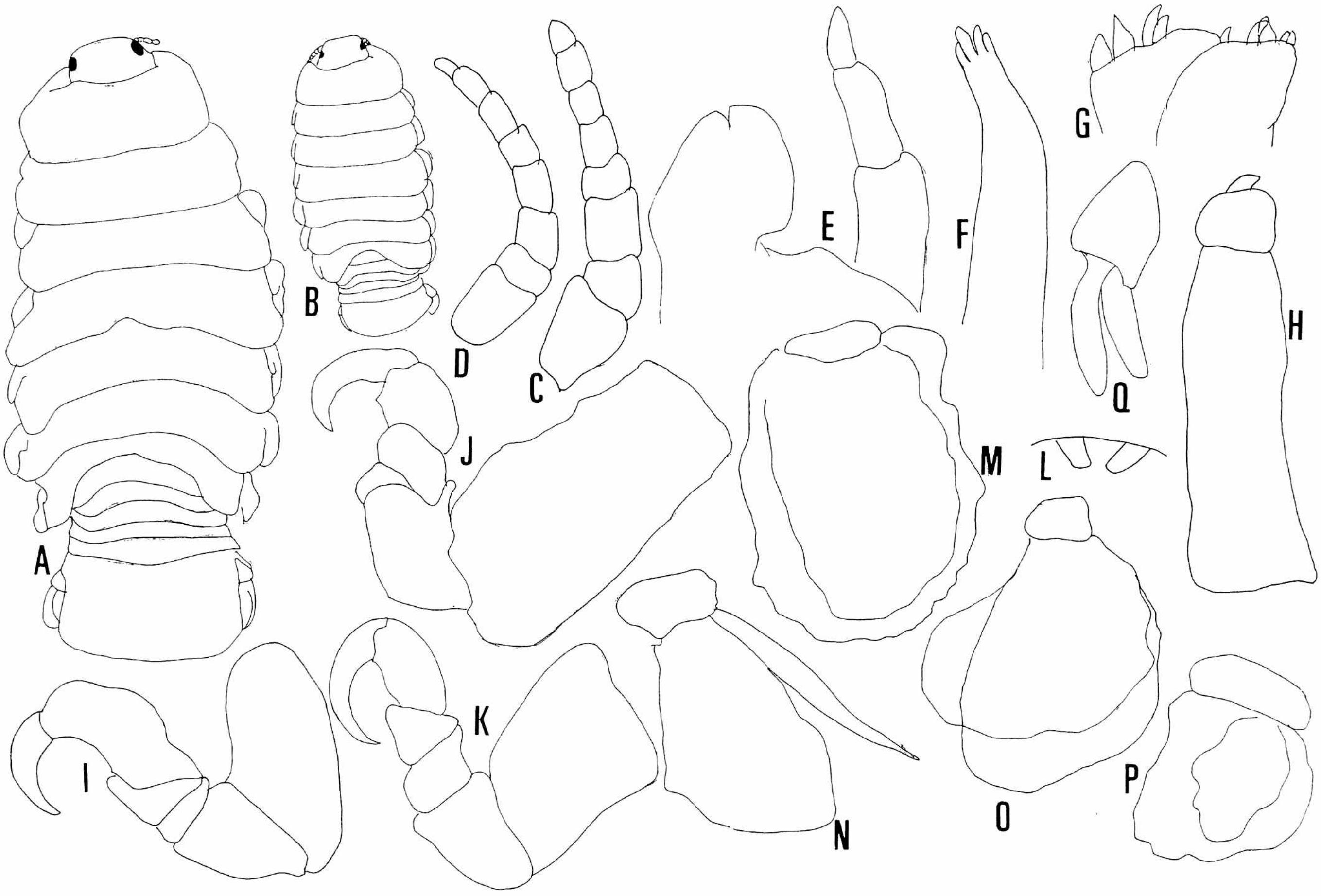

Fig.9 *Mothocya* sp.
A: Dorsal view of female; B: Dorsal view of male C: Antennule; D: Antenna; E: Mandible; F: Maxillula; G: Maxilla; H: Maxilliped; I: Pereopod 1; J: Pereopod 2; K: Pereopod 7 L. Penes; M: Pleopod 1; N: Pleopod 2; O: Pleopod 3; P: Pereopod 5; Q: Uropod (A: Female, B-Q: Male from *Fistularia commersonii* collected from the sea off Byobu-dani, Chichi-jima).

of maxilla, (5) more teeth of maxillula, (6) less numerous spines at the top of maxilliped and (7) bigger basis of pereopod (especially of pereopod (2). Though three specimens were available to me, species name was not determined.

Suborder Anthuridea

Family Anthuridae

Anthuridae sp.

(Figs. 10)

Material examined: 1♀ (1.9mm in body length) from the interstitial environments, Sakai-urea, Chichi-jima, Jan.10, 1995, coll. Ryohei Yamanishi.

Description: Female-Body (Fig.10A) 7.2 times as long as wide. Color white in alcohol. Cephalon rectangular. Anterior margin of cephalon with a medial and a pair of anterolateral low projections. Eyes lacking. Pereonal somite and pleonal somite without dorsal pit. Pleotelson (Fig.10F) triangular and posterior round margin, with a pair of big statocysts.

Antennula (Fig.10B) relatively short, 6-segmented. Antenna (Fig.10C), as long as antennule, and 6-segmented.

Mandible (Fig.10D): pars incisiva 3-headed; palp three-segmented: with 3 setae on distal area. Maxilliped (Fig.10E) 5-segmented.

Pereopod 1 (Fig.10F) stout: basis stout; ischium rather slender; merus short and rectangular carpus small and triangular; propodus wide, with a few of short setae on inner margin; dactylus long, about half the length of propodus.

Pereopod 2 (Fig.10G) :basis rectangular, about 3 times as long as wide; ischium a little shorter than basis; merus triangular, with a long seta on inner margin and a seta at outer distal corner; carpus triangular and a inner distal corner; propodus a little shorter than ischium, with 2 short setae at outer distal corner; dactylus rather stout with a seta.

Pereopod 3 (Fig.10H) : basis rather stout, with a seta on outer middle area; ischium a little shorter than basis, with a seta on the outer margin, a shorter seta at the outer distal corner and a seta on inner distal corner; merus triangular, with a relatively long seta on inner distal corner and 3 setae at the outer distal corner; carpus triangular, with a long seta at inner distal corner; propodus relatively slender.

Pereopod 4 (Fig.10I) : basis elliptical; ischium rectangular and almost as long as basis, bearing a series of fine setae on inner margin and a long seta on inner distal corner; merus half the length of ischium; carpus triangular, with a long seta on inner distal corner; propodus relatively slender.

Pereopod 5 (Fig.10J): basis elliptical, with a seta at the middle part of outer margin and a seta at inner distal corner; ischium a littler shorter than basis, with 3 setae on inner margin; merus triangular, with a long seta at the inner distal areas and a seta on outer distal corner; carpus triangular but shorter than merus, with a long seta at the outer distal corner and 4 setae on the inner distal area; propodus rectangular, with 4 spine-like setae on inner margin and

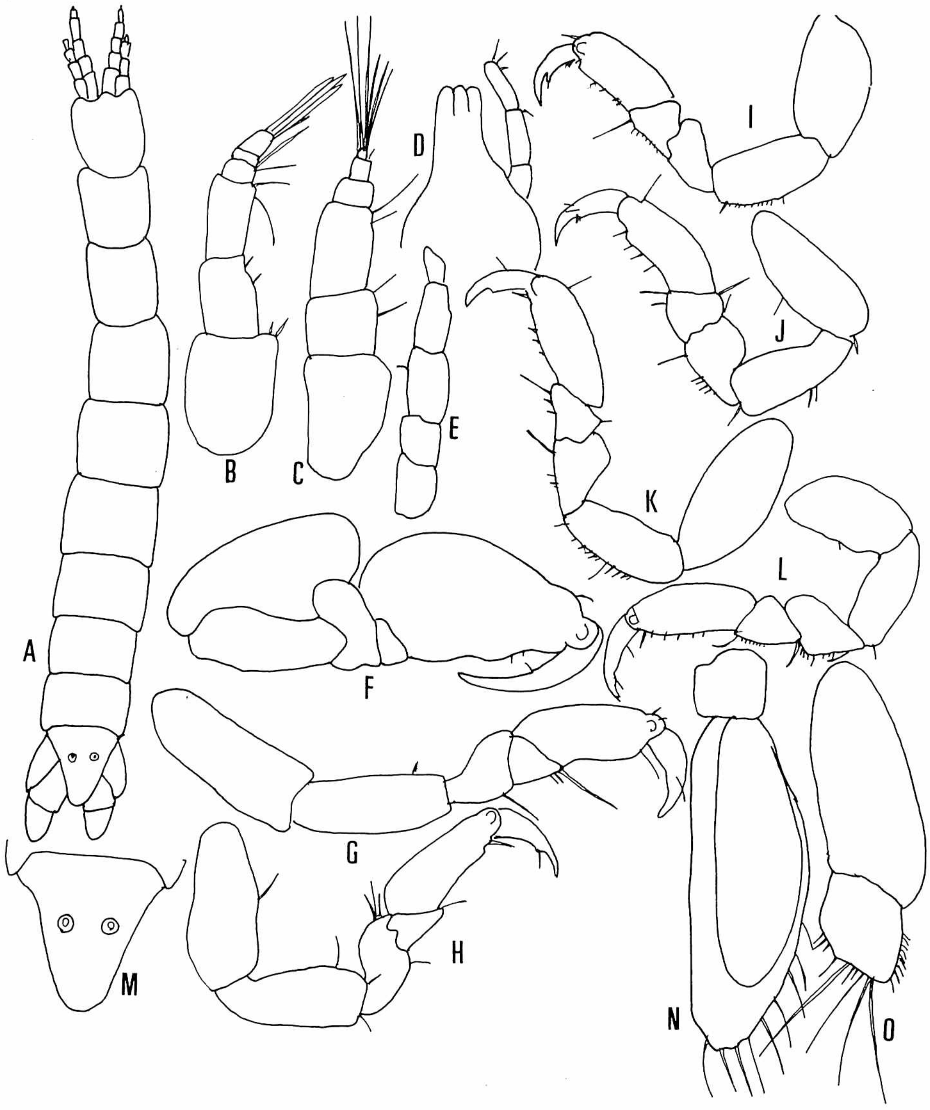

Fig.10 *Anthuridae* sp.
A: Dorsal view; B: Antennule; C: Antenna; D: Mandible; E: Maxilliped; F-L: Pereopods 1-7; M: Pleotelon; N: Pleopod 1; O: Uropod (Female specimens of Sakai-ura, Chichi-jima).

2 long setae on the distal area.

Pereopod 6 (Fig.10K): basis elliptical; ischium a little shorter than basis, with a series of shorter and 2 long setae on inner margin; merus 3/5 as long as ischium, with 4 setae on the inner margin, the distal outermost one is muchlonger that the other; carpus triangular, with 3 shorter and a long seta on the inner margin and a seta at the outer distal corner; propodus rectangular, as long as ischium, 6-7 teeth and a bigger teeth at the inner distal corner.

Pereopod 7 (Fig.10L) : basis elliptical, with a seta at the middle area; ischium as long as basis, with several shorter and along seta on inner margin ;merus 3/5 as long as ischium, with 3 setae on the inner margin, the distal outermost one is much longer that the other; carpus triangular, with 3 shorter and a long a seta in the inner margin and a seta at the outer distal corner; propodus rectangular, as long as ischium, with 4 teeth and a bigger teeth at the inner distal corner.

Pleopod 1 (Fig.10N) : basis almost square; endopod elliptical, with 6 setae around the margin; exopod lanceolate.

Pleopods 2-5: basis almost square; endopod and exopod lanceolate.

Uropod (Fig.10O): endopod with trapezoidal; basal segment and rounded; terminal segment with 4 long setae and many short hair; exopod elliptical.

Remarks: From the shape of pereopods, presence of statocysts on pleotelson and mouth part including maxilliped, the present specimen belongs to the family *Anthuridae* but unfortunately the specimen was broken, therefore, I could not determine the genus name.

Suborder Asellota

Family Microcerberidae

Microcerberus boninensis Ito, 1975

Microcerberus boninensis Ito, 1975; 119-128, figs.1-5.

Material examined: 1♀, Miyano-hama, Chichi-jima, Jan.9, 1995, coll. Ryohei Yamanishi.

Family Microparasellidae

Microcharon sp.

(Fig.11)

Material examined: 2♀♀ (0.9-1.3 mm in body length), interstitial environments of sandy beach. Miyano-hama, Chichi-jima, Jan 9, 1995 coll. Ryohei Yamanishi.

Description: Body about 9 times as long as wide excluding big uropod. Color pure white. Cephalon rectangular; antero-medial area slightly protruded. Eyes lacking. Pereonal somite almost. Pleotelson 1.5 times as long as wide.

Antennule (Fig.11B): 4-segmented; first and second segments rectangular; third segment almost square; terminal segment rectangular, with 2 longer and 2 shorter setae at apex. Antenna (Fig.11C): peduncle 3-segmented: first segment rectangular, with a long protruded part at distal area; second segment rectangular, with 2 setae; third segment rectangular, with a seta in basal half and 3 setae on distal margin: flagellum 8-segmented and bearing a long seta at the apex of terminal segment.

Mandible (Fig.11D): pars incisiva 3-toothed third palpal segment a little longer than the other two. segments. Maxilliped (Fig.12E): endite rectangular, with 5 setae on the distal margin; palp 5-segmented; palpal segment 1 pentagonal; segments 2 trapezoidal, with a seta on inner distal margin; third segment almost square, with 4 setae on the distal margin; other two segments slender.

Pereopods 1-7 (Fig.11F and G): basis rectangular; ischium a little shorter than basis; merus about half the length of ischium; carpus as long as basis; propodus slender and as long as carpus; dactylus big and bifid.

Uropod (Fig.11H): occupied more than 20% of the body length: basis big and long, with 3 setae on outer margin; endopod big, with a seta outer margin and 3 setae on inner margin and 3 long setae on distal margin at apex; exopod small and rectangular.

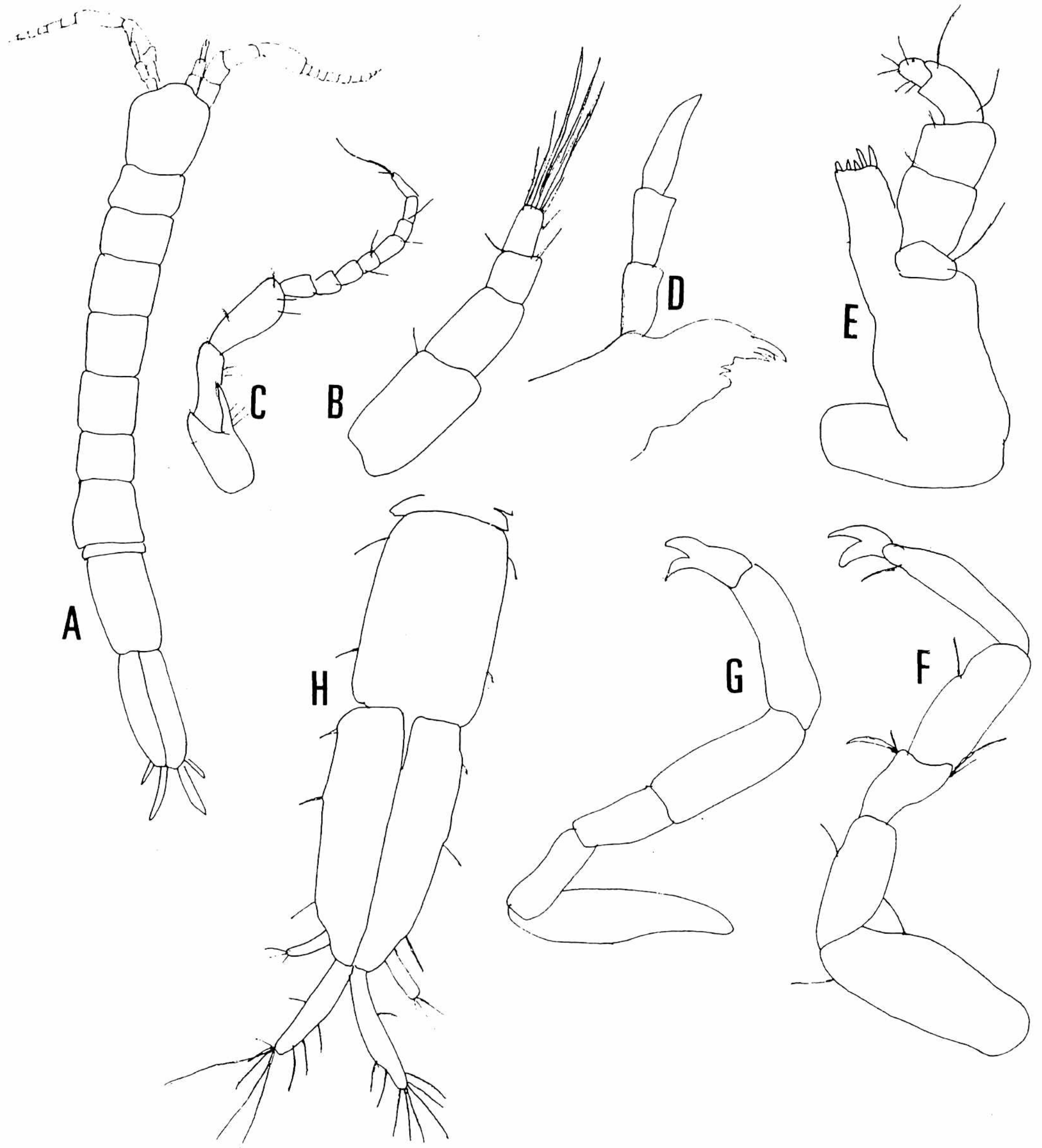

Fig.11 *Microcharon* sp.
A: Dorsal view; B: Antennule; C: Antenna; D: Mandible; E: Maxilliped; F: Peropod 2; G: Pereopod 5; H: Pleonal somite uropod (All: Female from Miyano-Hama, Chichi-jima).

Remarks: The present specimen is the first record of the genus *Microcahron* form not only from Bonin Island but also from all over the Japanese waters. Hitherto 66 species of the genus *Microcharon* from over the world, and this species is most closely allied to *M. stygius* Karaman from Yugoslavia, but the former is separated from the latter in the following features: (1) protruded central anterior area of cephalon, (2) shorter pleonal somite, (3) less numerous flagellar segments of antennule, (4) longer pleotelson, (5) less protruded antero-lateral area of pereonal somites and (6) less protruded postero lateral angle of uropod. But only a few specimens were available to me, I refrained to establish a new species.

Family Janirdae

Ianiropsis sp.1

(Fig.12)

Material examined: 1♀ (1.1mm in body length) from the interstitial sand of Wai-beach, Haha-jima Island, Jan.8, 1995, coll. Ryohei Yamanishi.

Description: Body (Fig. 12A) 4.2 times as long as wide. Color white. Cephalon almost square, with a flat medial process and a pair of lateral projection on anterior margin. Eyes small, each eye composed of 3-4 ommatidia. Pereonal somite. Pleotelson rounded.

Antenna (Fig.12B) reaching the anterior margin of fourth pereonal somite, flagellum 17-segmented.

All the pereopods (Figs. C-F) similar in shape: basis rectangular, with a seta at inner distal margin; ischium rectangular, with a seta at inner distal margin; merus a little shorter than merus:, carpus and propodus rectangular; dactylus bifid.

Uropod (Fig.12G) : basis rectangular; endopod slender; exopod half the length of endopod, with 3 setae at the tip and several setae on lateral margin.

Remarks: The present species is allied to *I. setiferra* Gurjanova from the Sea of Japan. but the present specimens are separable in the following features: (1) protruded antererior margin of cephalon, (2) less numerous setae, (3) less

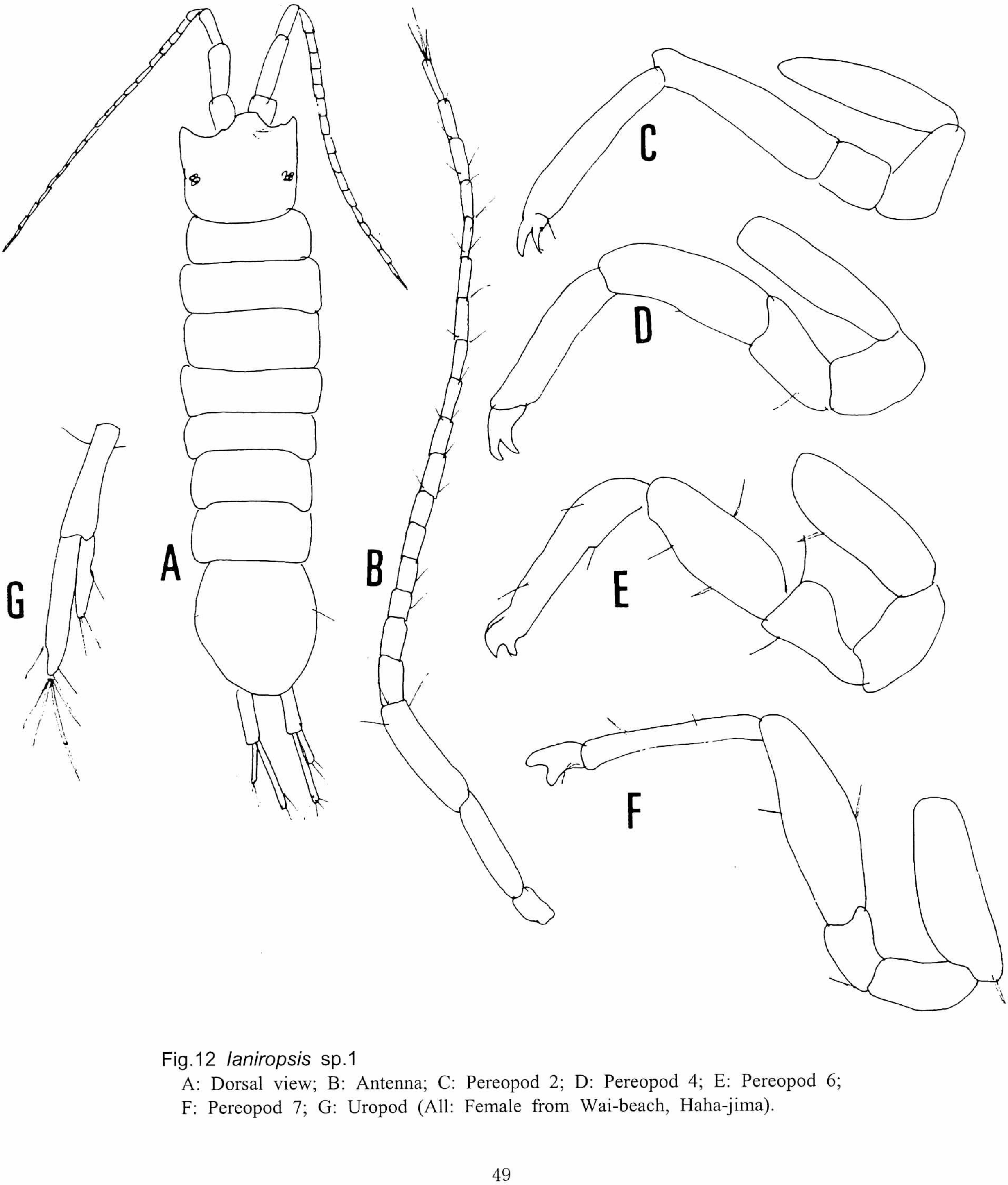

Fig.12 *Ianiropsis* sp.1
A: Dorsal view; B: Antenna; C: Pereopod 2; D: Pereopod 4; E: Pereopod 6; F: Pereopod 7; G: Uropod (All: Female from Wai-beach, Haha-jima).

numerous flagellar segments and (4) less numerous ommatidia of eyes.

Ianiropsis sp.2

(Fig.13)

Material examined: 1♀ (1.2mm in body length) from the interstitial sand of Miyano-hama, Chichi-jima Island, Jan. 9, 1995, coll. Ryohei Yamanishi.

Description: Body (Fig.13A) 4.8 times as long as wide. Color white not only in alcohol but also in lives. Cephalon almost square. Eyes small, each eye composed of 6 ommatidia. Pleotelson round with a sinuate margin.

Antennula (Fig.13B) reaching the anterior margin of pereonal somite, 5-segmented. Antenna (Fig.13C) reaching the anterior margin of fourth pereonal somite, flagellum 17-segmented.

Pereopod 1 (Fig.13D): basis elliptical, 3 times as long as wide; ischium a little longer than basis; merus as long as basis; carpus relatively short almost square; propodus long; dactylus bifid.

Pereopods 2-7 (Fig.13E-F): basis relatively thin; ischium as long as basis; merus with a relatively long seta at outer distal corner; carpus long, with a seta at outer distal corner at outer distal corner; propodus long with a setae at medial area of inner margin and a seta at outer distal corner; dactylus bifid.

Pleopod: basis long; endopod long and widening towards the tip, whose tip bearing 5 setae; exopod short and small with 2-3 setae at apex.

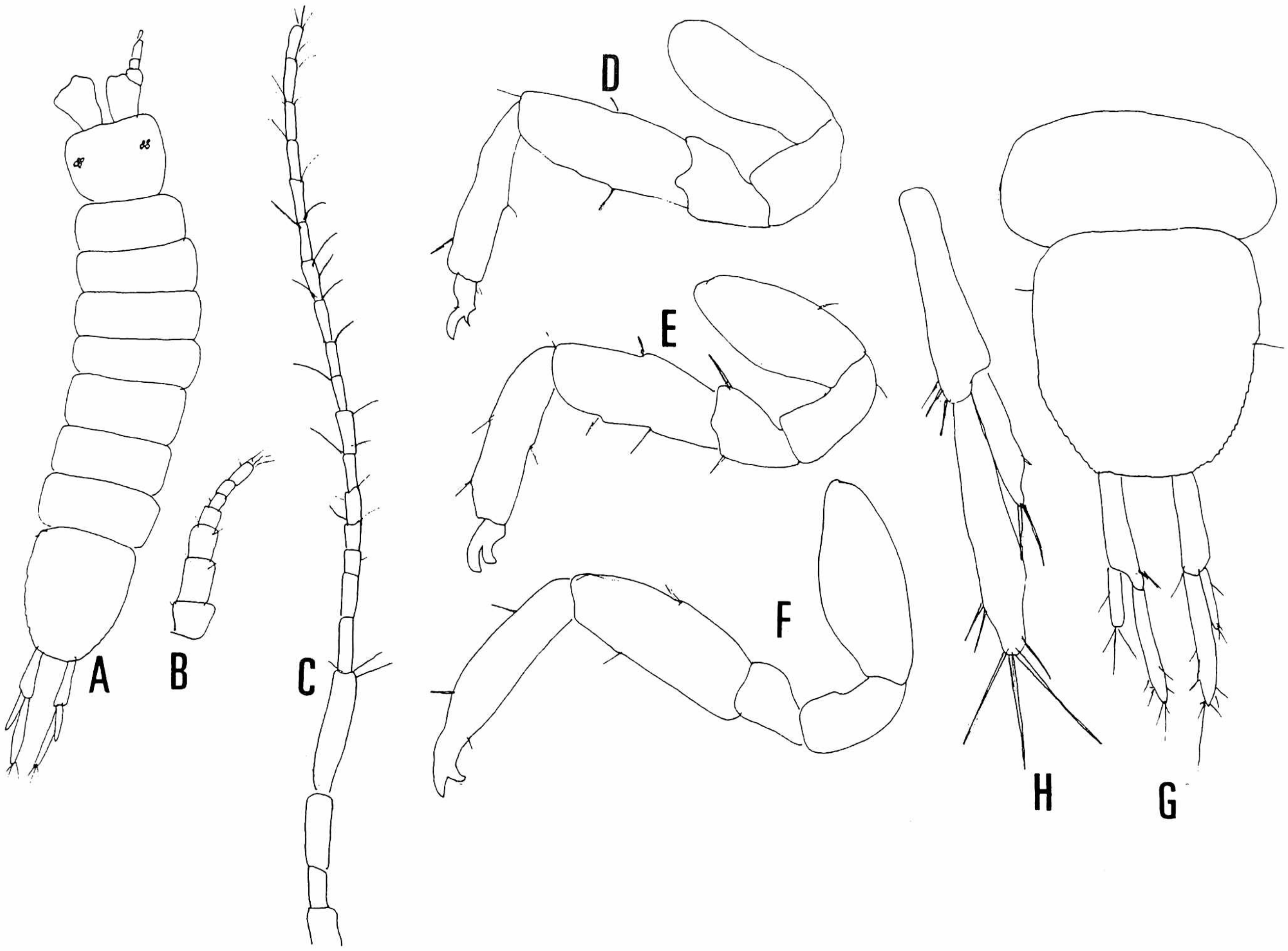

Fig.13 *Ianiropsis* sp.2
A: Dorsal view; B: Antennule; C: Antenna; D: Pereopod 1; E: Pereopod 2; F: Pereopod 3; G: Pleotelson and uropod; H: Uropod (All: Female from Miyano-hama, Chichi-jima).

Uropod (Fig.13H) : basis rectangular; endopod slender; exopod half the length of endopod, with 3 setae at the tip and several setae on lateral margin.

Remarks: The present species is allied to the specimens collected from Haha-jima Island, reported as *Ianiropsis* sp.1 in this paper, but the present specimens are separable in the following features: (1) less numerous flagellar segments and (2) more numerous ommatidia of eyes.

This species is also allied to *I. setifera* Gurjanova, 1950 from the Sea of Japan. but the former is different from the latter in the following features: (1) less numerous setae on pereopods, (2) less numerous setae on body surface, (3) less numerous flagellar segments and (4) less numerous ommatidia of eyes.

Family Ligiidae

Ligia yamanishii Nunomura, 1990

Ligia yamanishii Nunomura, 1990: pp 42-44, figs.158-159.

Material examined: 5♂♂ and 7♀♀, Hatsune-ura (type locality), Chichi-jima, coll.Noboru Nunomura 1♂ and 2♀♀ Miyano-hama, Chiichima, Jan.13, 1995, coll. Noboru Nunomura; 1♂ and 1♀ Okimaura, Haha-jima, Jan. 9, 1995 coll. Noboru Nunomura.

Family Olibrinidae

Olibrinus sp. (aff. *kushimotoensis* Nunomura, 1990)

(Fig.14)

Material examined: 1 ♂ (2.7 mm in body length), intertidal zone of rocky shore of Minami-zaki, Haha-jima Bonin Island, Jan.10, 1995, coll. Noboru Nunomura.

Description: Body (Fig.14) 2.8 times as long as wide. Color white. Cephalon rounded, with relatively big eye.

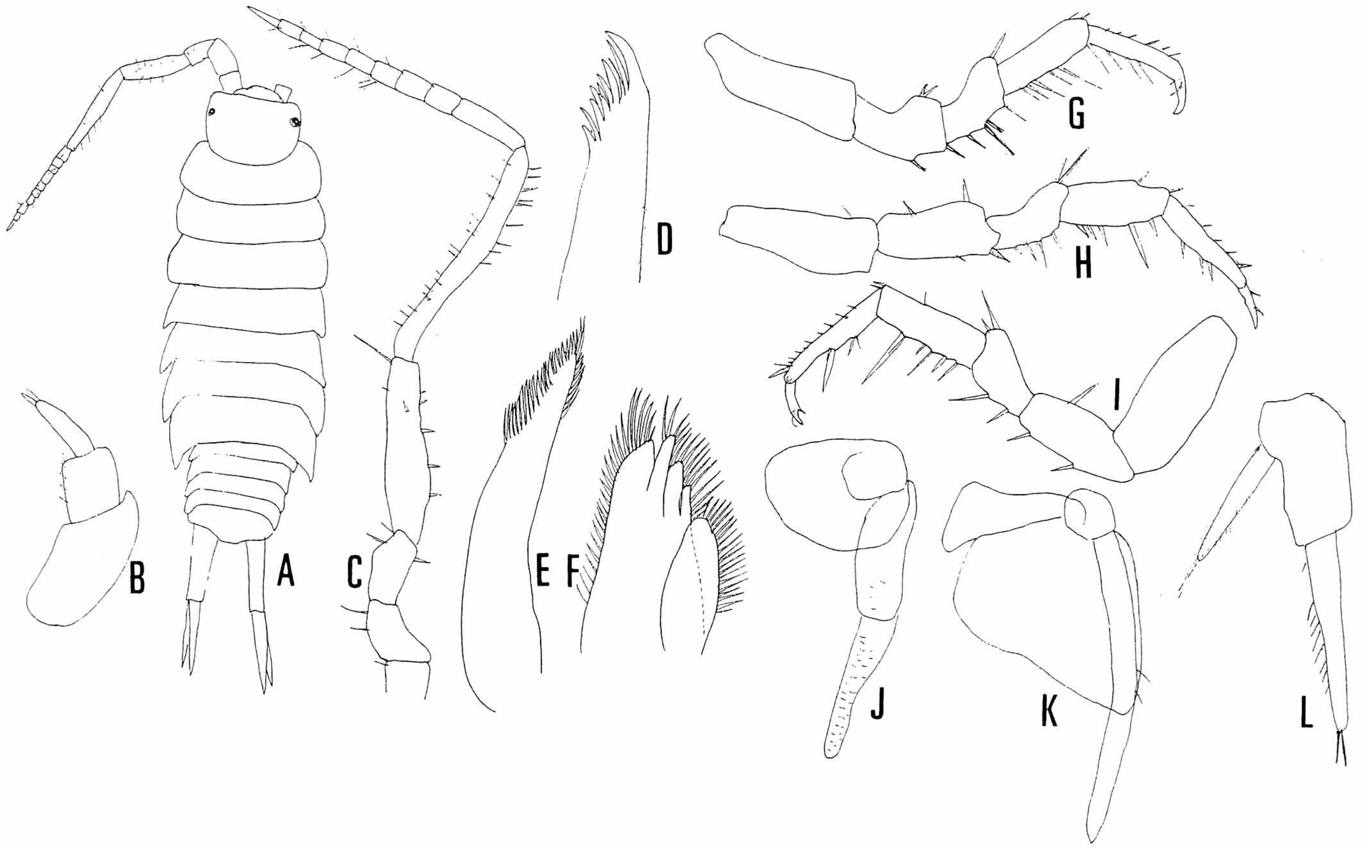

Fig.14 *Olibrinius* sp.
A: Dorsal view; B: Antennule; C: Antenna; D: Outer lobe of maxillula; E: Maxilla; F: Maxilliped; G: Pereopod 1; H: Pereopod 4; I: Pereopod 7; J: Pleopod 1 K: Pleopod 2; L: Uropod (All: Female from Minami-hama, Haha-jima).

Pereonal somite. Pleotelson

Antennule (Fig.14B) 3-segmented; first segment stout, with a small protruded angle; second segment 2/3 almost square; terminal segment narrow, with 2 aesthetascs at the tip. Antenna (Fig.14C) long and reaching the posterior margin of the fourth pereonal somite; flagellum 9-segmented; first segment 3 times as long as the other segments.

Right mandible: pars incisiva 3-toothed; lacinia mobilis toothed. Maxillula (Fig.14D): outer lobe with 11 simple setae at the tip. Maxilla (Fig.14E) relatively slender. Maxilliped (Fig.14F): endite slender. Palp only slightly with many setae around the margin.

Pereopod 1 (Fig.14G): basis rectangular; ischium 2/3 as long as basis with 2 setae on inner margin and a seta on distal margin; merus with 4 setae on inner margin and a seta at distal outer corner; carpus as long as ischium, with 5 setae on inner margin; propodus slightly shorter than carpus with 3 setae on inner margin and 3 shorter setae on outer margin.

Pereopod 4 (Fig.14H): basis rectangular; ischium slightly shorter than basis, with a spine at outer margin; merus 2/3 as long as ischium, with 4-5 setae on inner margin on 2 long setae at the outer distal corner; carpus rectangular, with various lengths of five setae on inner margin and 2 short setae on outer margin; propodus as long as carpus, with 3-4 setae and 6 setae on outer margin.

Pereopod 7 (Fig.14I) : basis rectangular, without any seta; ischium as long as basis bearing a long seta at the middle area of outer margin and 2 setae on inner margin; merus half the length of ischium with 2 setae on inner margin and a seta at outer distal corner; carpus rectangular, with a short seta on the middle area of outer corner, a seta at outer distal corner and 5 setae on inner margin; propodus slightly longer than carpus with 2 longer and 2-3 shorter setae on inner margin and 6-7 short setae on outer margin.

Pleopod 1 (Fig.14J) : endopod straight and gradually tapering towards the tip, with many bar-like on the distal half; exopod rounded square.

Pleopod 2 (Fig.14K) : endopod triangular, stylus almost straight; exopod concaved slightly outer ward, but its width is subequal form basal to distal part.

Uropod (Fig.14 L) stout and long: basis rectangular; endopod narrow and relatively short with 3-4 setae at apex; exopod stout and triangular, 1.3 times as long as basis.

Remarks: The present specimens are similar to O. *kushimotoensis* Nunomura reported from Kushimoto, Wakayama Prefecture, but the former is sepatated from the latter in the following features: (1) numerous flagella of antenna, (2) less numerous aesthetascs of antennula, (3) triangular exopod of male second pleopod, (4) position of noduli lateralis of pereonal somites and (5) round exopod of male first pleopod.

Family Scyphacidae

Armadilloniscus sp. (aff. *hoshikawai*, Nunomura, 1984)

(Fig.15)

Material examined: 1 ♂ (5.2mm in body length), Okimura, Haha-jima, Jan. 8, 1995 coll. Noboru Nunomura, 2 ♀♀ (2.5-3.5mm in body length), Miyano-hama, Chichi-jima, Jan.13, 1995, coll. Noboru Nunomura; 1♀ (2.6mm in body length), Sakai-ura, .Chichi-jima, Jan.10, 1995; coll. Noboru Nunomura.

Description: Body (Fig.15A) 1.9 times as long as wide. Color purple brown with paler irregular patterns. Cephalon rectangular, with a protruded middle process. Eyes small, each eye composed of 10 ommatidia.

Antenna (Fig.15B) reaching the posterior margin of first pereonal somite; flagellum 4-segmented; mutual length of 4 segments is 1: 2: 2: 1, with a tuft of 5-6 setae at the tip.

Right mandible (Fig.15C): pars incisiva 4-toothed; lacinia mobilis 2-segmeted; 2 hairy bristles behind lacinia mobilis; processus molaris represented by a tuft of big tuft, consisting of and numerous setae. Left mandible: pars incisiva 4-toothed; lacinia mobilis 2-segmeted; 2 hairy bristles behind lacinia mobilis; processus molaris represented by a tuft of very big and numerous setae. Maxillula (Fig.15D): inner lobe with setae at the tip; outer lobe with and a bundle of setae 10 setae at the tip, 6 of which pectinated. Maxilla weakly bilobed. Maxilliped (Fig.15E) : endite round;

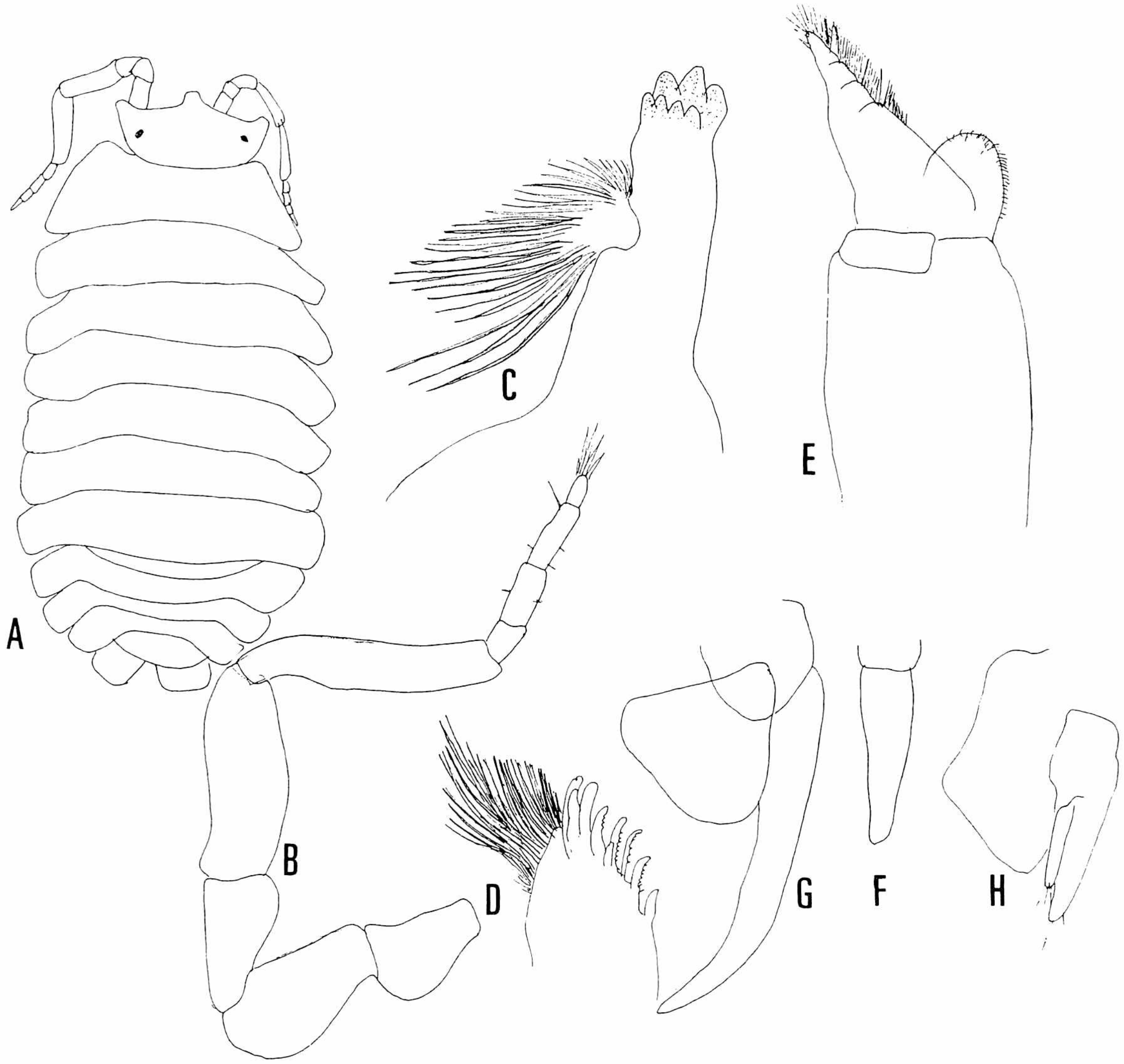

Fig.15 *Armadilloniscus* sp.
A. Dorsal view; B.Antenna; C: Mandible; D: Outer lobe of maxillula; E: Maxiliped; F: Penes; G: Pleopod 2; H: Uropod (All: Male from Oki-mura, Haha-jima).

palp only partly sinuate and setae only in inner margin.

Pereopod 7: basis rectangular, 2.9 times as long as wide, ischium 0.53 times as long as basis, with several setae on inner margin; merus half the length of ischium, 2 setae on inner margin and a seta at outer distal margin; carpus 1.3 times longer than merus, with 4 setae on inner margin; propodus relatively short.

Penes (Fig.15F) fusiform.

Pleopod 2 (Fig.15G) : endopod revurved; exopod rounded and triangular.

Uropod (Fig.15H) : basis broad; endopod stylifom, with a seta at the tip; exopod 66% as long as exopod, with 3 setae at the tip.

Remarks: The present specimens are similar to *A. hoshikawai* Nunomura reported from Okinawa islands. But the specimens differs from *hoshikawai* in the following features: (1) triangular exopod of male first pleopod, (2) stouter endopod of male first pleopod, (3) rounded endite of maxilliped and (4) bigger eyes.

Family Alloniscidae

Alloniscus boninensis Nunomura, 1984

Alloniscus boninensis Nunomura, 1984, pp. 28-30, figs. 46-47 (Kuwanokiyama, *Bischofia japonica* forest, 260m in altitude Haha-jima I.; Sekimon-zan, Haha-jima; south of Yoakeyama, Chichi-jima I., Bonin Is., Tokyo Pref.)

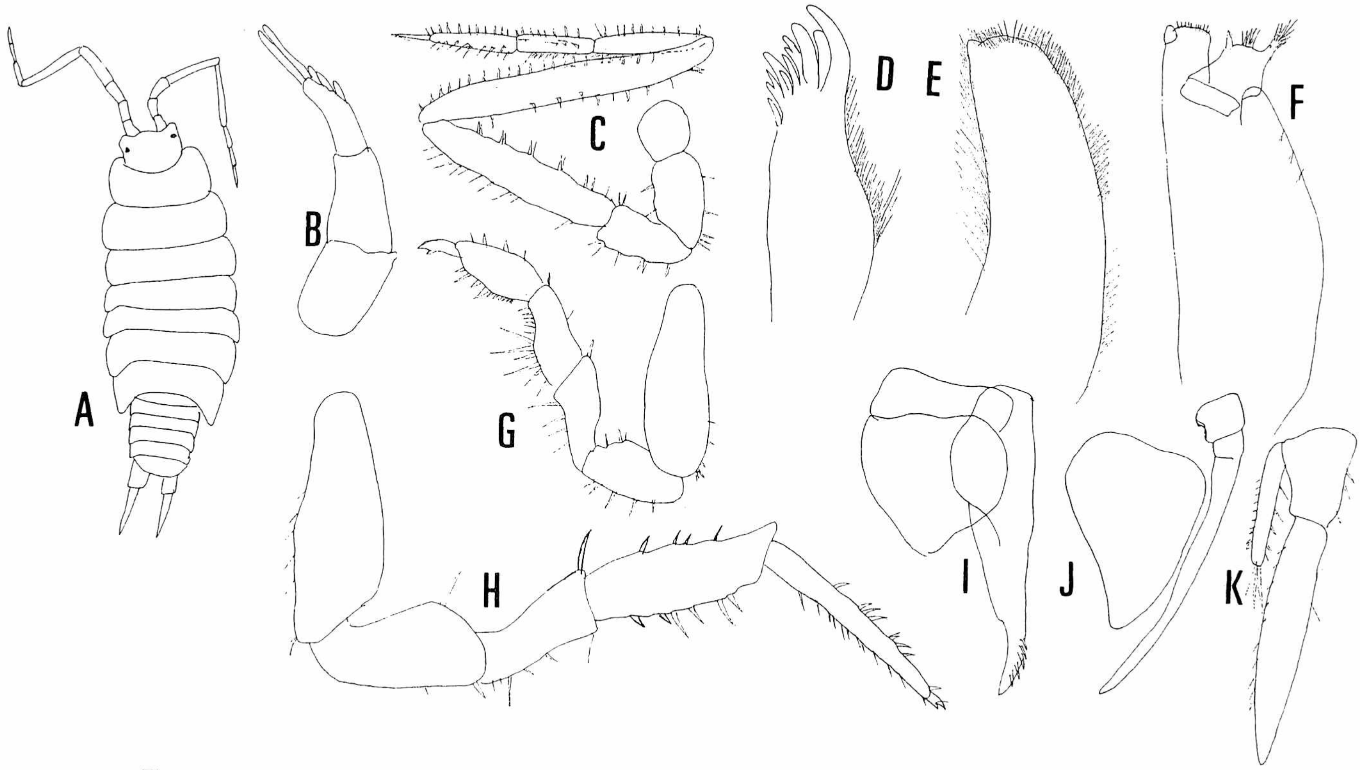

Fig.16 *Littorophiloscia* sp.
A. Dorsal view; B: Antennule; C: Antenna; D: Maxillula; E: Maxilla; F: Maxiliped; G: Pereopod 1; H: Pereopod 7; I: Pleopod 1; J: Pleopod 2; K: Uropods (All: Male from Sakai-ura, Chichi-jima)

Material examined: 1♂1♀, Kuwanomi-yama, Haha-jima, June 24, 1977, coll. Junichi Aoki and Hiroshi Harada; 1♂, Yoakiyama Chichi-jima, July 1, 1977.

Burmoniscus boninensis Nunomura, 1986

Burmoniscus boninensis: Nunomura, 1999b, p87. *Setaphora boninensis* Nunomura, 1986 Nunomura, 1986, p. 33, figs. 76-77 (forest of Leucaena glauca, south of Miyano-hama, Chichi-jima I., Bonin Is., Tokyo Pref.).

Material examined: 1♀, Omotohama, Haha-jima, Jan.8, 1995, coll.Noboru Nunomura.

Family Philosciidae

Littorophiloscia sp. (aff. *nipponensis*, Nunomura, 1986)

(Figs.16 and 17)

Material examined: 2♂♂1♀ (5.4mm in body length), Sakai-ura, Chichi-jima, coll. Noboru Nunomura, Jan.1995. 1♀, Okimura, Haha-jima, Bonin Island, 1♀, Okimura, Haha-jima, Noboru Nunomura, Jan.9, 1995; 2♀♀, Hatsune--ura, Chichi-jima, Noboru Nunomura; 1♀, Miyanoura, Chichi-jima, Jan.13.1995, coll. Noboru Nunomura.

Description male.: Body (Fig.16A) 2.9 times as long as wide. Color white. Cephalon almost rectangular but its posterior margin slightly rounded. Eyes relatively small; each eye composed of 8 ommatidia. The position of noduli lateralis on pereonal somite is as Fig.17.

Pleotelson with blunted posterior margin.

Antennule (Fig.16B) 3-segmented, terminal segment with 2 longer and 3 shorter aesthetascs. Antenna (Fig.16C) long, reaching the middle area of fourth pereonal somite; the fourth and fifth peduncular segments pretty long.

Right mandible: pars incisiva 4-toothed. Left mandible; pars incisiva 4-toothed. Maxillula (Fig.16C) : inner lobe with 2 long plumose setae; outer lobe with 10 simple setae. Maxilla (Fig.16D) weakly bilobed. Maxilliped (Fig.16E): endite truncated; palp 3-segmented.

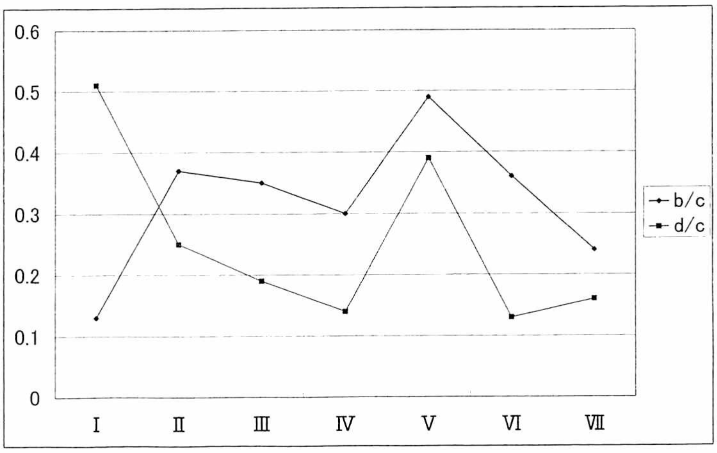

Fig.17. Position of noduli lateralis of *Littorophiloscia* sp. (Male from Sakai-ura, Chichi-jima).

Pereopod 1 (Fig.16G): basis 2.9 times as long as wide; ischium 1.9 times as long as wide; merus half the length of basis, with 5 setae on inner margin and 2 setae on outer margin; carpus as long as merus, with 6 longer setae on basal half of inner margin and 6 shorter setae on distal half of inner margin; propodus as long as carpus, with 7-8 short setae on basal half of inner margin and 4 setae on outer half of inner margin.

Pereopod 7 (Fig.16H) : basis 2.7 times as long as wide; ischium 0.7 times as long as basis; merus half the length of ischium, with 2 setae on inner margin and a seta at outer distal angle; carpus 1.3 times longer than merus; propodus rectangular and relatively short.

Pleopod 1 (Fig.16I): endopod straight, with 5-6 denticles on apical area.

Pleopod 2 (fig.16J): endopod straight; exopod rounded.

Uropod (Fig.16K) long: basis; endopod; exopod long, times as long as basal width.

Remarks: The present specimens are most closely allied to *L. nipponensis* reported from Honshu, Shi-koku and Kyushu. But it differs from latter in the following features: (1) longer antenna, (2) longer uropod, (3) smaller eyes and (4). But I refrained to establish new species, because only female specimens are available to the present study.

Family Armadillidae

Spherillo boninensis Nunomura, 1990

Sphaerillo boninensis Nunomura, 1990, p. 19, fig. 146 (forest of *Casuaria equisetifolia,* Suzaki, Chichi-jima I., Bonin Is., Tokyo Pref.).

Venedillo boninensis: Nunomura, 1999b, p90.

Spherillo boninensis: Schmalfuss 2003, p276.

Material examined: 2♀♀, Omotohama, Haha-jima, Jan. 8, 1995, coll. Noboru Nunomura; 2♀♀, Okimura, Haha-jima, Jan. 9, 1995, coll. Noboru Nunomura 2♀♀ Kominato, Chichi-jima Jan. 10, 1995 coll. Noboru Nunomura; 4♀♀, Miyano-hama, Chichi-jima, Jan. 13, 1995 coll. Noboru Nunomura.

Family Porcellionidae

Porcellionides pruinosus (Brandt, 1833)

Poccellis pruinosus: Brandt, 1833, p19.

Metoponorthus pruinosus: Hilgendorf, 1893, p154.

Porcellionides pruinosus (Brandt, 1833): Nunomura, 1987 pp.73-76 fig.135.

Material examined: 1♂1♀, Omotohama, Haha-jima, Jan. 8, 1995, coll. Noboru Nunomura. 2♂♂6♀♀, Miyano-hama, Chichi-jima, Jan. 13, 1995, coll. Noboru Nunomura.

Discussion

From the result of the present survey, a total of 26 species including 18 marine species and 8 maritime terrestrial species were obtained from the sea shores of Chichi-jima Island and Hahajma Island.

As a whole, the shore and shallow sea isopod crustacean fauna shows the following tendencies:

1. All the species are considered to be subtropical or warm-temperate species. The Climate of Bonin island is relatively higher than any other regions in Japan.

2. As to the free-living marine shore species, all species exclusively surface-dwelling ones, because in Bonin Islands, coral reef and mangroves estuaries are not so rich.
3. As to the marine free-living species, most of them are relatively small-sized ones. Relatively big-sized marine species is limited to only *Cirolana harfordi harfordi*. Adding to this, comparing with each species within each genus, relatively smaller species occurs in Bonin Island than in Honshu and other main island of Japan.
4. Because there are many sandy beaches, and many of them are composed of coarse sand, interstitial species are rich, not only in the number of individuals but also in number of species.
5. Terrestrial species are rich, not only in number of species but also in their population size.
6. The species found in this survery are grouped in the following four categories:
   (1) Endemic to Bonin Islands: *Microcerberus boninensis*, *Alloniscus boninensis*, *Ligia yamanishii* and *Gnorimosphaeroma albicauda*. And other undermined species are also considered to be endemic.
   (2) Pan pacific elements: *Cirolana harfordi*. This relatively large species is distributed widely in Pacific Ocean.
   (3) Izu Islands-elements: *Cymodocella* sp., *Armadilloniscus* sp. and *Littorophiloscia* sp.
   (4) Southern Japan coast species: *Olibrinus* sp.

References

Bruce, N. L., 1986. Cirolanidae (Crustacea: Isopoda) of Australia. *Rec. Aust. Mus., Suppl.*, 6: 1-239.

Bruce N.L. and D.A. Jones, 1981.The systematics and ecology of some Cirolanid isopods from Southern Japan *J. Nat. Hist.* 15: 67-85.

Donadson, T.J. & R. F. Meyer, 1994. Zoogeography of Fishes of the Marina, Ogasawara and Izu Islands: a Preliminary Assessment. *Nat. Hist. Res. Special Issued* 1: 303-332.

Karaman, S., 1933. Neue Isopodednaus unterirdischen Gewassern Jugoslaviens. *Zool. Anz.* Bd. 102, 16-22,

Karaman, S., 1934. Beitrage zur Kenntnis der isopoden Familie. Microparasellidae. *Mitt. Holhen u Karastfortsh., Berlin,* 26-30.

Kondo, Y., 1995. Paleoccurent reconstruction, using imprecated tests of nummulite in the Eocene of Haha-jima, Ogasawara Island. *J. Geol. Soc. Jap.* 101:228-234.

Kussakin, O.G., 1979. Marine and brackish isopoda of Cold and Temperate Waters of the Northern Hemisphere I. Suborder Flabellifera. *Academy of Science U.S.S.R. Leningrad,* pp.1-472.

Kussakin, O.G., 1982. Ditto II. Suborder Valvifera Anthuridea etc. *Academy of Science U.S.S.R. Leningrad*, pp.1-462.

Kussakin, O.G., 1982. Ditto III. Suborder Asellota (1). *Academy of Science U.S.S.R. Leningrad,* pp.1-500.

Ito, T., 1975. A new Species of Marine Interstitial Isopod of the Genus Microcerberus from the Bonin Islands. *Annot. Zool. Japon.* 48 (2): 119-128.

Nunomura, N., 1983. Studies on the Terrestrial isopod Crustaceans in Japan I. Taxonomy of the families Ligiidae, Trichoniscidae and Olibrinus-dae. *Bull. Toyama Sci. Mus.* 5:23-68.

Nunomura, N., 1984. Studies on the Terrestrial isopod Crustaceans in Japan II. Taxonomy of the Family Scyphacidae. *Bull. Toyama Sci. Mus.* 6:1-43.

Nunomura N., 1986. Studies on the Terrestrial isopod Crustaceans in Japan III. *Bull. Toyama Sci. Mus.* 9:1-72.

Nunomura, N., 1987. Studies on the Terrestrial isopod Crustaceans in Japan. IV. Taxonomy of the families Trachelipidae and Porcellionidae. *Bull. Toyama Sci. Mus.* 11:1-76.

Nunomura, N., 1990. Studies on the Terrestrial isopod Crustaceans in Japan V. Taxonomy of the families Armadillidiidae, Armadillidae and Tylidae, with Taxonomic Supplements to some other families. *Bull. Toyama Sci. Mus.* 13:1-58.

Nunomura, N., 1991a. Sttudies on the Terrestrial isopod Crustaceans in Japan VI. Further Supplements to the taxonomy. *Bull. Toyama Sci. Mus.* 14:1-26.

Nunomura, N., 1991b. Terrestrial isopod fauna of Bonin Island (In : Report of the Second General Survey on Natural Environment of the Ogasawara (Bonin) Islands. Tokyo Metropolitan University.

Nunomura, N., 1992a. Studies on the Terrestrial isopod Crustaceans in Japan Ⅶ. Further Supplements to the taxonomy-3. Bull. Toyama Sci. Mus. 15: 1-23.

Nunomura, N., 1992b. Three Cymothoid Isopods collected from the sea off the Bonin Island *Bull. Toyama Sci.* 15:35-45.

Nunomura, N., 1995. Guide to seashore Animals of Japan with Color Pictures and Keys Ⅱ (Saburo Nishimura, ed.) *Hoikusha,* Osaka, 663+figs.73-144 (in Japanese).

Nunomura, N., 1999a. Sea shore isopod crustaceans collected from Izu Island, Middle Japan. *Bull. Toyama Sci. Mus.* 22: 7-38.

Nunomura, N., 1999b. Taxonomical Revisions on some Groups of Terrestrial Isopods in Japan *Edaphologia* 62: 81-91 (in Japanese).

Poore, G.C.B. & H. M. L. Ton, 1985. *Apanthura*, *Apanthretta* and *Apanthuropsis*, gen. nov. (Crustacea: Isopoda; Anthuridea) from South eastern Australia. *Memoires of the Museum Victoria,* 46: 103-151.

Richardson, H., 1904. Isopods collected in the year 1900 by the US fish commission by the U.S. Palos. Proc. U.S. Nat. Mus. 1904: 32-45.

Richardson, H., 1905. A monograph of North American Isopoda. *Bull. U. S. nat. Mus*. 54:1-727.

Seno, T. and S. Maruyama, 1984. Paleogeographic reconstruction and origin of the Philippine Seas. *Tectonophys* 102: 53-84.

Schmalfuss, H., 2003. World Catelog of terrestrial isopods (Isopoda: Oniscidea). *Stuttgarter Beitr. Nalurk.* Ser. A. 654: 1-341.

Thielemann, M., 1910. Beiträge zur Kenntniss der Isopodenfauna ostasiens. *Abhandl. Bayer. Akad. Wiss.* Suppl. Bd. 21-110.